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Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1991	Final Report (07-90 to 07-91)

4. TITLE AND SUBTITLE
An Investigation of the Medical Record Processing System at Walter Reed Army Medical Center

5. FUNDING NUMBERS

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Walter Reed Army Medical Center
Washington, D.C.
20407-5001

8. PERFORMING ORGANIZATION REPORT NUMBER
9b-91

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army-Baylor University Graduate Program in Health Care Administration
Academy of Health Sciences, U.S. Army (HSHA-MH)
Fort Sam Houston, TX 78234-6100

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
[DISTRIBUTION STATEMENT]
Approved for public release;
Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

14. SUBJECT TERMS

PAGES
184

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
N/A	N/A	N/A	UL

AN INVESTIGATION OF THE MEDICAL RECORD PROCESSING SYSTEM AT WALTER REED ARMY MEDICAL CENTER

A Graduate Management Project

Submitted to the Faculty of the

Baylor University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Healthcare Administration

by

Captain Michael Rowbotham, MS

December 1991

Running head: MEDICAL RECORDS PROCESSING SYSTEM

TABLE OF CONTENTS

Acknowledgments

I would like to acknowledge the contributions of several parties in the preparation of this Graduate Management Project. Foremost, I am deeply appreciative of the opportunity that the United States Army has afforded me, by allowing me to participate in the US Army - Baylor University Program in Healthcare Administration. The longevity and continued funding of this program in a time of increasing resource scarcity is a testament to the US Army's foresight and commitment to providing health care to its soldiers and other eligible beneficiaries. I would also like to thank Colonel Donald A. Johnson for his encouragement and timely guidance during the study. I am particularly grateful to Major Timothy Williamson, Ms. Sandra Allen, Ms. Kathleen Peterson, Colonel Randall Kelley, Lieutenant Colonel Robert J. Heckert Jr., and Sergeant First Class Eley Day for allowing me to participate in their efforts to improve the medical records management system at Walter Reed Army Medical Center. Maintaining and improving this complex system

has been their sobering responsibility. Any success described in this project is the direct result of the efforts of these dedicated professionals. I also acknowledge the valuable research conducted by Major Michael Hicks concerning many of these same problems during 1986 and 1987. It served as a foundation for this study in many ways.

Abstract

The medical record processing system at Walter Reed Army Medical Center is an integral part of one of the largest hospitals in the Department of Defense. The inability to process inpatient records within 30 days, in accordance with the standards of Joint Commission on the Accreditation of Healthcare Organizations, was identified as the problem. This problem was studied using a variety of quantitative and qualitative research methods. The results indicate that the current methods and procedures are adequate to support timely record processing but that there are few incentives for prompt completion of Inpatient Treatment Records.

The processing mechanism could achieve greater efficiencies through an increased use of automation, management information systems and minor procedural changes. Automated record tracking software and bar coding are prime examples of technological improvements. Voice recognition and transcription is a

developing technology that could improve efficiency tremendously in some settings.

The greatest opportunities for improvement lay in the human resource management arena. The research indicates that a large portion of the total processing time can be categorized as "awaiting physician action". Results of the study also indicate that physicians perform medical record tasks based on their perception of their leaders' priorities, expectation of supervision and the reward structure that exists in their service or department. Incentives such as (a) off-post training events, (b) comments on evaluations and, (c) informal recognition would lead to improved physician performance in the medical records arena.

Implementing procedural and technological improvements in concert with human resources management measures should dramatically improve the medical records processing system at WRAMC. Such improvements would result in a decrease in delinquent medical records.

LIST OF TABLES

Chapter I - Introduction

Conditions which Prompted the Study

Walter Reed Army Medical Center (WRAMC) is a 1000 bed tertiary care facility located in Washington, D.C. and operated by the Department of the Army. It is a world famous hospital that has been in continuous operation since 1909. WRAMC has treated military casualties from across the nation during times of war and peace as well as congressmen, presidents and foreign dignitaries. It is the largest medical treatment facility within the Department of Defense (DoD) and is known as the flagship of Army Medicine.

Like other hospitals, Walter Reed Army Medical Center uses individual treatment records to document the course of treatment for each patient. The medical record has several other uses which include but are not limited to: (a) communicating information between providers, (b) serving as an official document for any legal action and (c) as a basis for reimbursement. The Inpatient Treatment Record (ITR) contains information about a single patient and usually only one course of

treatment. Several diverse sources input information into the ITR. Much of the information is administrative (patient identification, unit/address, social security number, privacy act statement, etc.) but, the majority of the data in the treatment record is medical data entered by clinicians.

Thousands of patients are admitted to Walter Reed Army Medical Center each year and even more are treated as outpatients. Patients often interact with several different providers during the course of a single visit and may not see the same providers for care in the future. Many patients require highly specialized care provided by a diverse medical staff of providers. This specialization and the large number of people involved with patient treatment increases the importance of the medical record as a means of patient care communication.

This study is primarily concerned with the system of managing the inpatient medical records. The Department of the Army refers to these documents as the Inpatient Treatment Records (ITR). The importance of

completing the medical record in a timely manner is widely recognized. Standards for prompt completion have been set by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) and the US Army (Medical Records and Quality Assurance Administration, Army Regulation 40-66. 1985).

Inpatient Treatment Record processing time has been below established standards for some at WRAMC. Internal evaluations and external inspections by the JCAHO also support this position. WRAMC was accredited in 1987 with a major finding based on a high percentage of delinquent ITRs. The results of 1990 JCAHO inspection showed marked improvement in processing of ITRs. However, the overall efficiency and effectiveness of the system is still below desired performance levels.

A financial problem associated with slow records completion is untimely reimbursements. Since the hospital treasurer cannot submit required detailed diagnostic information to third party payers until the record is complete, the hospital fails to obtain prompt

reimbursement of funds. This is the equivalent of maintaining interest free accounts receivable for indefinite periods of time.

Statement of the Management Problem

The current medical records processing system at Walter Reed Army Medical Center often requires greater than thirty days to process an Inpatient Treatment Record.

Literature Review

Medical records are an important part of a larger hospital information system. Medira (1989) describes how many health care information systems are frequently modified on a "crisis-to-crisis" basis and that few are effectively planned using proven guidelines. What is perhaps more discouraging is that many planned systems become dysfunctional or ineffective because the managers attempt to use management techniques standardized in other organizations. By using programs developed by others outside of the organization, managers do not allow themselves to adapt the system to their own needs within their unique environment.

Austin (1972) has long been a critic of hospital information systems and describes how they have not realized their potential for management control. He compares hospital information systems to those found in for-profit commercial systems. He blames the lag in hospital performance on top managers. Their lack of involvement in design and management leads to a lack of utilization and failure. A successful system must integrate accounting, patient billing, pharmacy, medical records, providers, laboratories, administration and other areas into one effectively managed system. (Austin, 1972).

He also points out that many systems "suffer a conceptual limitation" in that they seek to gather information for the sake of gathering information (Austin, 1972). Information should be collected and used as a basis for management decisions. Hospital managers also fail to make the most effective use of the data that they have collected. Often times simplistic summaries and one dimensional reports are generated. They do not take advantage of modern

automated data processing equipment's capability to perform multiple complex analyses between separate but related functions.

Leaders in the field of medical records management are also examining the matter of departmental productivity. As systems become more and more complex, it is easy to consider the failure to achieve operational objectives to be a result of the nature or size of the task. Managers may feel that additional time and manpower is the answer to many of their problems. Often, it is a matter of working smarter instead of working harder (Kahn & Kibeski, 1989). By analyzing what tasks the staff of a medical records department performs and how much time each of these functions consume, managers will be able to analyze how well the daily operation of the department matches their plans for achieving departmental objectives. Such a system also has the ability to monitor individual productivity. Managers may choose to emphasize or deemphasize this aspect of the program

depending on the perceived consequences of increased supervision.

The medical record is most closely associated with a single organization that creates and maintains it. However, there are numerous routine requirements for hospitals to provide medical record information to external organizations. Holbrook (1989) discusses the growing difficulties in managing correspondence concerning medical records information. External organizations include a wide variety of third party payers, Professional Review Organizations (PRO) and several state and federal government agencies.

The issue involves three smaller problems that exacerbate each other: (a) increases in the sheer size of the medical record, (b) increased cost of producing correspondence and (c) an increased number of requests for information from these external organizations. Increased record size and more requests for more information are associated with the increased complexity of reimbursement and legal requirements to document carefully. The author proposes solutions to

these problems that rely on improved and more widespread technology to increase speed and efficiency of information recall and transfer.

Some of the difficulty in managing records results from their composition and the way records are generated. Early medical records were simply small collections of paper. This reflected the environment in which the records were developed. Care was simpler and did not involve as many different providers as today. We also have moved from a society that accepted the beneficent immunity of health care providers to the most litigious society in history (Fox & Imbiorski, 1987). The media of hand written or typed papers also reflected the state of the art in information management. This was the most effective method of rapid, reliable and inexpensive data management that was available until recently. In her 1989 article, Brennan points out that records management has been complicated by the myriad of patient monitoring devices and the wide variety of diagnostic laboratory tests that are routinely performed on patients

(Brennan,1989). Clinicians, and nurses in particular, are inundated with all of this information that must be managed and integrated into the medical record.

Early attempts to overcome these problems used current technology in the form of stand alone computer systems that clinicians could use at the bedside. The major shortcoming in this approach was that the device managing the record could not interface with any of the devices that supplied additional input or with computer systems at other locations. The system still required manual input which consumed a great deal of the providers' time.

A Patient Data Management System (PDMS) manages patient records electronically. This is an integrated system which receives data from other devices such as monitoring equipment (EKG, pulse, blood pressure, etc.) and makes the information accessible through many peripherals. There are several advantages to using an electronic PDMS. Information can be analyzed and complex calculations may be performed instantly. In addition to providing improved clinical access to the

record, PDMS offers advantages for record management. The information in the record can be transferred very quickly without physically transporting it. The information contained in the records can also be searched quickly using automated data processing equipment. These benefits all lead to increased efficiency and productivity. (Brennan, 1989).

Benjamin and Baum recognize the benefits of a completely automated medical record and describe an ideal medical record as being a "longitudinal record" since it would contain all the different episodes of care provided over a person's life. At the same time they are quick to point out the difficulties in developing such a system. The barriers to efficiency are (a) trust in automated systems, (b) lack of provider involvement, (c) slow development of managers that use and support automation and (d) user computer skills. The authors suggest that the best way to overcome all of these barriers is to involve users in the development of systems (Benjamin & Baum, 1989).

Benjamin and Baum hold that the single greatest reason for slow acceptance of automated systems is resistance by providers for ethical reasons that revolve around security. Besides clinging to the traditional practice of "patient charting," providers are very concerned about patient confidentiality and the autonomy of their own practice (Benjamin and Baum, 1998). The lack of unique hand written documents also alters the nature of proving how care is delivered. This places clinicians at risk legally.

Besides these attitudinal barriers, these systems also rely heavily on complex and expensive developing technology. There is also a question of how effective an automated system can be. The requirements for any effective records system are that it: (a) streamline information collection and dissemination, (b) produce appropriate desired reports and (c) provide essential current information to clinicians at the time and location required. The barriers to effectiveness are varied. Security controls are a major concern. Since access to the record is not location dependent, it is

much more difficult to control access to it. The systems used so far have also been lacking in ability to manage records as managers require and their user interfaces have been less than user friendly. Not surprisingly, the opposite is also true. Many users are not computer friendly and are resistant to change (Benjamin & Baum, 1989).

Other types of technology have been useful in helping hospitals meet these challenges in medical records. Generating typed reports which are incorporated into the medical record can be a troublesome task. In some settings, microcomputer based voice recognition systems have proven to perform as well as or better than traditional dictation and transcription systems (Holbrook & Aghababian, 1990; Voice Med, 1990a). In addition to saving time and personnel costs, these systems may even assist clinicians in providing and documenting better care. Physicians in Massachusetts, using these systems as part of a program, have been given a 20% discount on their malpractice insurance premiums (Voice Med,

1990b). These systems make it very easy to produce timely and complete records. The participating physicians have decreased their risk of being unable to prove that they treated patients properly.

Another technological advancement in automation has helped hospitals manage their medical records more effectively. Many products exist that enable record managers to track and locate records. This is especially important in systems where care is provided at multiple locations. These products often interface with automated patient appointment systems and aid in getting records to the appropriate clinics at the right time. The data that is stored in this system can also be analyzed and processed to generate numerous useful management reports. (Journal of the AMRA, 1990).

Barcoding medical records can also be effective in quickly managing diverse actions for a large number of records. Since the amount of time spent handling each record is reduced and each record may be handled several times for tracking, these systems can greatly reduce the amount of time the record is unavailable or

delayed. These systems help to establish an audit trail for records as they are processed. (Majercowicz, 1990).

In a previous study, that was quite similar to this project, Isley, Gray and Smith (1990) investigated Brooke Army Medical Center's (BAMC) ITR delinquency. This is a particularly relevant study since BAMC is a 600 bed tertiary care Army medical center. BAMC's similarity to WRAMC and the recent timing of the project make it particularly noteworthy. After numerous interviews and analysis of data they concluded that the wide variation in performance was greatly influenced by leadership and the emphasis placed on the program by key individuals. They further concluded that the existing system could support the requirement to process ITRs in less than 30 days.

The WRAMC medical record processing system was the subject of a Graduate Research Project in 1986. Hicks (1987) designed organizational structures and procedural mechanisms to improve the processing of inpatient records at Walter Reed. His analysis of the

system concluded that: (a) WRAMC suffered from personnel shortages (particularly transcriptionists), (b) there was a lack of commonly available Automated Data Processing Equipment (ADPE), and (c) the mechanism for monitoring and accounting for charts in the system was unreliable. He also concluded that systemic inefficiency resulted from (a) delays in transcription (internal and external), (b) lags in physician dictation and signature and (c) searches for "loose elements" (results of tests and consultations performed outside of the ward). He also found that ITRs were occasionally lost and there was no mechanism to identify the loss or take corrective action (Hicks, 1987).

Hicks recommended several measures to improve the system. He described creative ways to increase staffing of the internal transcription section. He encouraged centralizing records processing to facilitate accountability and monitoring. Another strong recommendation was that WRAMC procure word processing equipment and an integrated automated record

tracking system. Hicks also recommended continued training for medical records technicians and frequent meetings between the two major directorates which control the components of the system (Patient Administration and the Directorate of Medical Activity Administration). He encouraged streamlining the system by collocating coders with the charts in the chart rooms. He proposed the idea of developing a contract for a high performing transcription service which could be rewarded with the bulk of WRAMC's tremendous transcription workload. Hicks addressed the shortcomings and potential of the then new Automated Quality of Care Evaluation Support System (AQCESS) and felt that this system could be useful in managing records processing as part of each medical case. Lastly, he recommended reasonable standards be set for each department and service as well as individual physicians. Administrative directorates would monitor compliance with these standards and provide information to the Deputy Commander for Clinical Services (DCCS)

and the Chief of Staff who would each take steps to enforce the standards.

Perhaps the most important references are those that set the standards for the system's performance. Army Regulation (AR) 40-66, Medical Records and Quality Assurance Administration, states that "after a discharge of a patient, the practitioner will complete his or her portion within 4 working days (i.e. final progress note, narrative summary, cover sheet). If a test result is pending, 7 days will be allowed" (AR 40-66, 7-10, 1987). The regulation further requires that each facility establish procedures to satisfy the requirements of the JCAHO. The JCAHO standards require that "the records of discharged patients are completed within a period of 30 days following discharge" (AMH, MR 3.9, 1990).

Purpose

The purpose of this project was to document the current functioning and performance of the medical records processing system at WRAMC. Investigation of different processes and products of the medical record

processing system identified problem areas and generated possible solutions.

Chapter II - Research

Introduction and Overview

During the research, I examined the entire medical records processing system. This extensive examination was necessary to identify which portions of the system were most problematic. The historically problematic process of transcription received special attention during the study. The study was "systems oriented" and did not simply focus on existing policies, procedures or existing technology.

A prerequisite task to studying the system was to first gain an understanding of the organization that it supports. WRAMC is a large medical center with a very complex organizational structure. The countless different relationships that exist within and between departments are a major part of the corporate culture. The faults described in the introduction involved suspected inefficiencies in the various steps of the ITR processing system and medical records management. It was important to examine the entire system, identify

the correct problems and focus management's efforts on resolving the most important issues.

At the initial stage of the project, the perceived problem was the inability to quickly transcribe reports and obtain physicians' signatures. The initial working plan was to document the designed mechanism of the current system as well as its actual performance, identify problematic areas in the system and offer alternate systems or modifications to the current system that may contribute to achieving system goals.

Data about the current system was collected through observation, interviews with principal personnel and reading about the system. Reviewing reports generated by the system and policies that describe how the system should operate was a good source of information. Evaluations of the system were also very valuable. Interviewing users was the most enlightening source of information about the system. Primary data was gathered using original research. Objective data was gathered regarding patient admissions and the movement of records through the

system. Less objective data and subjective evaluations were gathered using a survey.

Organizational Environment

The actual functioning of the system cannot be studied in a vacuum or as a separate independent system. Neither can it be seen as a distinct bounded step in a larger sequence of patient care. The performance of this system is determined solely by the functioning of its integral components. It is also shaped by its environment. The medical records processing system at WRAMC is a unique system suited to its unique environment. WRAMC's location, size, ownership, and mission have tremendous impact on the form and functioning of its medical records processing system.

WRAMC is located in the northern part of Washington, D.C. This has a profound effect on many aspects of hospital operations. Human resources management in the region has been somewhat problematic. Supervisors have found it difficult to hire personnel. Many people don't want to work at WRAMC for many

reasons: the pay, the lack of parking, traffic, the working conditions/hygiene factors. It is difficult to retain employees for many of the same reasons. Additionally, many of those who do work here transfer to other government jobs once they have entered the federal employment sector and acquired some job experience. There is a considerable amount of turnover among civilian employees. Some human resources managers feel that it is symbolic that the front entrance to the hospital is fitted with revolving doors. This urban location allows the WRAMC Civilian Personnel Office (CPO) to draw from a very large pool of perspective employees. However, this urban population is plagued by many of the same problems that affect other large American cities.

As a military hospital, there is also continuous programmed personnel turnover. Officers and enlisted soldiers leave the service or are typically reassigned after a three to four year tour of duty. This encourages fresh ideas but decreases institutional memory and management continuity. WRAMC's

beneficiaries or service population are all DoD personnel, their dependents, retirees, their dependents, and others designated by the Secretary of the Army. Care is provided to most of these patients as a service benefit. Only the Secretary of the Army designees and civilian emergency patients are billed for care. The military staff is salaried and civilian employees are either salaried or work for an hourly wage. Unlike civilian hospitals, none of the hospital staff, to include physicians, are paid based on the quantity of care provided. There is no direct benefit to physicians for prompt completion of ITRs as in the civilian system, where the billing process is tied to chart completion. At the same time there seems to be few disincentives or deterrents to slow chart processing.

There are fiscal and organizational factors involved as well. The Army staffs its organizations using a standardized authorization document, which may be modified over time, based on workload. This is not very responsive to the rapidly changing needs of

clinical practices or the technology which supports the mission. Many of WRAMC's authorization documents have not been updated for more than five years and reflect older systems and a lower work load. Civilian organizations may be more flexible, since smaller firms can often just hire the people that are needed. When the Army does hire civilian workers, the Civilian Personnel Officer can typically only offer a set wage for the level of skill involved as prescribed by Title 5 of the US Code. At the same time other government agencies (i.e. National Institutes of Health and the Veterans Administration) operating under Title 38, are authorized to hire employees at the current market wage rate. This attracts and retains employees with the desired skill level.

Technology is an important part of our environment. Medical technology can make inpatient hospital cases complex. We can collect more data through more tests than ever before. This plethora of data makes individual patient cases more difficult for the physician to record. Additionally, the complex

terminology can present problems for the transcriptionists. The transcriptionists, as a rule, do not specialize into single a sub-specialty, so they must be familiar with the vocabulary of many specialties and sub-specialties. The technology available to process the record offers some hope. Automation and Artificial Intelligence products can perform much of the work faster, cheaper, and more reliably than older manual methods.

Being a large medical center, there are over fifty separate teaching programs. Thus many of the physicians in the hospital are residents. They have to learn the many aspects of practicing medicine and institutional policies all in addition to learning the art and science of medicine. A further complicating factor is that they rotate from one service to another that may have different policies and/or support arrangements. The residents' ITRs also need the signature of an attending physician supervising the case. This is one more step in a long sequence of events that would not be found in a non-teaching

hospital. The frequent turnover and rotation of residents, combined with their limited experience with the hospital and their need for an attending physician's endorsement are factors which would tend to slow and complicate the ITR processing system in a teaching hospital. Conversely, one positive aspect of working with resident physicians is that they are typically associated with a single hospital and its ITR processing system, as opposed to civilian staff physicians who may practice at several hospitals each with different policies and systems.

Another important organization in WRAMC's environment is its higher headquarters, Health Services Command (HSC). As a headquarters, HSC operationalizes the policies of the Surgeon General of the Army. HSC delineates many of WRAMC's missions, authorizes its programs and prescribes policy. HSC evaluates WRAMC's performance formally and informally. Leaders at HSC rate the job performance of many of the key leaders at WRAMC and allocate resources to the hospital.

WRAMC's location in a large city, current technological developments and the medical center's mission as a teaching hospital make it's operation different from most. It's size, staffing and military mission make it quite unique. All of these factors must be considered in analyzing the form and function of the medical center and its medical record processing system.

Components of the System

Many different groups of people handle the ITR or portions of it during the process. It is important to understand their functions and how they relate to other elements. Wards under the Department of Nursing (DON) are responsible for handling the ITR before discharge, to include placing all required reports into the record. Each ward is tasked to assemble all currently available documents and deliver the ITR to the appropriate chart room. Prior to its arrival in the chart room, much of the ITR processing cannot begin.

The ward staff is part of the Department of Nursing. The wards are staffed with Medical Records

Technicians (MRT) who perform the majority of the records maintenance while the ITRs are on the wards. Until recently, the MRTs with this responsibility were part of the Directorate of Medical Activities Administration (DMAA). They performed the general missions assigned by the DMAA and responded to day-to-day duty assignments on the nursing ward. There was a potential for conflicting priorities under these conditions. For these reasons and many others (Patillo, 1990) the DMAA was reorganized and the MRTs were integrated into the organization of the wards where they work. The leaders of these wards also took on the responsibility for records maintenance on their wards.

Physicians are naturally a key component. It is their thoughts and actions as health care providers and case managers that are being recorded. The system relies on them to dictate information and verify printed versions of the information they have presented to the system. These reviews are potential choke points since all preliminary actions must be completed

prior to waiting for dictations and signatures. Seemingly, little else can proceed while waiting for these actions.

The Transcription Section is rather distinct. They do one thing only: turn voice information into printed format, with a by product of electronic text. The manager and all commonly shared transcriptionists are centrally located. The daily coordination with a contracted transcription service occurs here as well.

The chart rooms are a component of the Patient Administration Directorate (PAD) as well. The three centralized Chart Rooms are staffed with MRTs who serve as facilitators to monitor and expedite the entire process. Besides serving as a storage site for incomplete records and a dictation input facility, the chart room is staffed by MRTs who analyze and track the ITRs as they are processed. They collect and direct information for the records and at the same time generate information about the record for their own use. The PAD Coding Section is a decentralized organization. Coders located in each of the chart

rooms recheck the ITR for completeness and assign the final clinical diagnostic and treatment procedure codes for the case.

Management gathers and monitors information to effect inputs and outputs by monitoring system performance. Managers are charged with "keeping the gears oiled" through, coordinating contracts, hiring, firing and other personnel matters. They also provide the logistics, equipment and facility support.

Consultative services (Radiology, Laboratory etc.) perform tests and/or therapies as directed by physicians. Reports from these activities return to the ward or service and are eventually sent to the chart room to become part of the ITR.

Fundamental Method of Processing ITRs at WRAMC

While an individual is an inpatient at WRAMC, an ITR is maintained for that patient on the ward to which he is assigned. Any test results or provider progress notes generated outside of that ward are routed to the ward and inserted into the record.

Many of the patients require operative procedures during their course of treatment. A report of the operative procedure (Op Report) must be included in the ITR. AR 40-66 and departmental policies require that physicians dictate Op Reports immediately after the procedures. While some services rely on the PAD Transcription Service to transcribe these reports, other services use organic microcomputers and word processing software to modify template reports of common procedures which vary little. After dictation and transcription, the Op Report is sent to the appropriate service. This is almost always done before discharge and dictation of the Narrative Summary.

The Narrative Summary is a concise summary of the course of treatment. It contains the all significant findings, all procedures performed, the patients condition upon discharge and other specific aspects of the case (AR-66, 1987). Since patients may be discharged shortly after operations or die during them, there may not be sufficient time to prepare the Op Report and any consequential Pathology Report before

discharge. But for the most part, recovery allows some time for dictation and transcription of the Op Report, so the physician may review it while preparing the Narrative Summary. Ideally, this process occurs before the ITR moves from the ward to the chart room. There is a great deal of variability among services' requirements for Op Reports. The typical time between operative procedures and discharge and the mechanism for producing the reports differ between departments and services. Consequently, the chart rooms do not track the process of preparing Op Reports.

Upon discharge from a ward the record is forwarded to the chart room that serves that ward. Medical Records Technicians in these chart rooms respond to the arrival of the ITR by initiating a record of the ITR's activity in the system. By noting the characteristics of the patient's stay (i.e. length of stay, disposition, type of care, location, etc.) and noting the occurrence of key events, the technicians can "track" the status of individual ITRs to insure that the appropriate elements are included in the ITR.

Technicians inspect the ITR for problems such as the absence of several required documents. They prepare a list of discrepancies or actions to be accomplished and attempt to gather the needed documents. Knowledge of an ITR's status is required to expedite individual ITRs through the process. The patient discharge is the first key event in this sequence. It serves as the beginning of the 30 period allowed to complete the record. Another key event is the date the ITR is forwarded to the chart room.

The next critical event in this sequence is the physician's dictation of the Narrative Summary of the patient's inpatient course of treatment. After "logging the ITR in", and analyzing its deficiencies, MRTs place the working ITR on a partitioned shelf bearing the appropriate physician's name. This is known as his "box". The date the ITR goes into the box is recorded temporarily in the data base using a field know as "notes". After dictation, that "note" is replaced with more recent notes about other deficiencies. As previously stated, it is important to

have any Op Reports for the patient completed and filed with the ITR so physicians can review these operations while summarizing the case. Physicians dictate their Narrative Summaries to a central voice recording system that can be accessed from numerous special telephone-like peripherals located in the Chart Rooms. Physicians may also input their dictation over any commercial touch tone phone using special codes. Most commonly, physicians use the devices in the chart rooms since they are simpler to operate and they are collocated with the ITR containing all of the progress notes, reports and test results completed up to that point. The date that the Narrative Summary is dictated is noted and included in the chart room database record of processing the ITR.

The transcription process follows dictation. The central voice recording system records the physician's voice using electronic digital coding much like a stereo compact disk. This technology has several advantages over analog processes such as audio tape. The quality of the recording is superior to analog

recording and provides the transcriptionists with clearer reproductions of the dictator's voice. Another important advantage of digital recording is the ability to share and transfer the data using common Automated Data Processing (APD) technology.

Each physician's dictation of a case is input as a separate file, even if a physician dictates several Narrative Summaries in one sitting. Each case is stored as a distinct file identified by a sequence of characters input from the "telephone" key pad. The files of voice data represent individual "jobs" for the transcriptionists. Transcriptionists in the section are equipped with a PC and a modem-like device, known as a port, that allows multiple users to access the central system simultaneously. The Transcription Supervisor may either make all jobs available to the pool of transcriptionists or assign individual jobs to specific transcriptionists by directing jobs to the appropriate port. Jobs are queued in the equivalent of an electronic "in box" for each transcription port. Since the jobs are distributed using common ADP

technology, transcriptionists need not be located near the recording system to receive work. Approximately half of WRAMC transcription is done by a contracted firm located far from the WRAMC installation.

In addition to allowing a manager to assign the dictation jobs and transfer data, the central voice recording system also collects management data on the jobs and transcriptionists. The dates of dictation, assignment to a port/transcriptionist and transcription completion are all recorded in the system's database. Statistics of activity for each port is recorded. Since only a single transcriptionist works at a port during a given time period, her performance for that period can be evaluated. Output is measured in lines of text. Once the transcriptionist completes typing a job, she prints it onto a standard form. If all the information is complete and correct, this printed form will become part of the ITR.

Batches of printed Narrative Summaries are delivered to the chart rooms where they are sorted and inserted into the ITRs. The ITR with a transcribed

Narrative Summary is placed back on to the appropriate physician's box in an "awaiting signature" status.

After the resident physician's review and signature, ITRs are batched and brought to the PAD coders. At this point, highly trained MRTs review the record and assign a code corresponding to the appropriate Individual Patient Data System abstracting, which includes diagnostic codes from the International Classification of Diseases, 9th edition (ICD 9). After completing the entire batch of ITRs brought to them, the coders return the batch of ITRs. The group of coded ITRs is retrieved by the chart room staffs and sorted into the boxes of the appropriate attending physicians. The attendings review the resident's work and sign the appropriate forms in the ITR. This counter signature of the supervising physician is required by US Army regulations. After this is accomplished, the ITR is considered complete. Completion is noted by the chart room staff and the ITR is delivered to the PAD for final disposition.

The role of the Chart Rooms and its staff is critical to this process. The tasks they perform are not explicitly required by any external regulations. Their procedures exist only to facilitate the process of completing all of the other required tasks involved. Chart room MRTs perform all of the record review, filing and database maintenance for the system.

Variations of the Fundamental Method

Not all ITRs at WRAMC are processed in the manner just described. Some services with unique requirements and sufficient clerical personnel transcribe all of their own dictations. Medical boards and psychiatry are two elements with unique formats and terminology that function this way. These services are satisfied with their autonomous arrangement and have satisfactory performance in completing ITRs.

Another major consideration regarding how an ITR will be processed is the patient's length of stay. If the patient is an inpatient for 72 hours or less, the case may be summarized in the final handwritten progress note and a Narrative Summary need not be

dictated for transcription (AR 40-66). Although the resident physicians are involved with many of the cases at the medical center, some cases are handled solely by the staff physicians or senior physicians in fellowships. In either case, the ITR is the responsibility of a staff physician and does not require the review of another attending physician.

System Performance

Evaluating the performance of the system was an interesting project. At face value, its ability to meet the standard could be measured by simply counting the number of delinquent records. However, this elementary approach would produce little additional data that could be used to investigate how the results were attained.

The Medical Record Weekly Report

The most commonly used management report is the Medical Record Weekly Report. See sample report included in Appendix C. Using a combination of computerized reports of discharges, and manual record searches the PAD produces a report detailing: (a) total

weekly patient discharges, (b) cumulative number of ITRs outstanding, (c) cumulative number of outstanding ITRs that are delinquent (not yet coded,and already coded) and (d) the weekly total number of records completed. Each of these numbers is calculated for each individual service.

In addition to these service or department totals, the report is also summarized for the entire hospital producing the total number of ITRs delinquent for as given period. Although the percentage of ITRs that are delinquent is not provided directly on the report, one can easily calculate this by summing the number delinquent (both coded and uncoded ITRs) and dividing the total by the number of incomplete ITRs. Another method of measuring ITR delinquency, used by the JCAHO, is to divide the average monthly discharges by the number of delinquent records for a month. The data and calculations for the period beginning 6 Aug 90 and ending 21 Apr 91 appear in Table 1.

Table 1. Weekly ITR delinquencies, August 90 - April 91

Week Beginning	Total Incomplete	Total Delinquent	% Delinquent
6 Aug	1,889	1,401	.74
13 Aug	1,916	1,251	.65
20 Aug	1,979	1,031	.52
27 Aug	2,138	1,224	.57
4 Sep	2,228	1,233	.55
10 Sep	2,322	1,306	.56
17 Sep	2,196	1,269	.58
24 Sep	2,220	1,090	.49
1 Oct	2,205	946	.43
9 Oct	2,286	995	.43
15 Oct	2,357	1,099	.46
29 Oct	2,359	1,150	.48
5 Nov	2,367	1,188	.50
12 Nov	2,397	1,283	.54
26 Nov	2,249	1,285	.52
10 Dec	2,451	1,281	.52
17 Dec	2,517	1,323	.52
31 Dec	2,375	1,517	.63
7 Jan	2,316	1,445	.62

Table 1. Weekly ITR delinquencies (continued)

Week Beginning	Total Incomplete	Total Delinquent	% Delinquent
14 Jan	2,247	1,416	.63
21 Jan	2,335	1,497	.64
28 Jan	2,332	1,434	.61
4 Feb	2,179	1.296	.59
11 Feb	2,179	1,322	.59
18 Feb	2,315	1,289	.55
25 Feb	2,304	1,288	.55
4 Mar	2,092	1,202	.57
18 Mar	2,176	1,222	.56
25 Mar	2,156	1,166	.54
1 Apr	2,051	1,002	.48
8 Apr	2,003	1,104	.55
15 Apr	2,039	965	.47

The Processing Dates Study

Original research also provided additional information about the system and how it performs. In the initial phase of the investigation it was noted that there was a great deal of suspicion about what was wrong, which steps took longer than they should, about which organizations were not working properly and many estimates of just how good or bad the performance of the system was. However, aside from the data summarized in the Medical Records Weekly Report there were very few quantitative measures of many aspects of the system's performance, particularly specific information about different services and the different major activities in the process. Quantifiable measures of many important aspects of the system should be useful tools for managers responsible for the system. It was also suggested that different clinical services as well as different chart rooms performed significantly worse than others and should be the focus of management efforts to decrease processing time.

Experimental design. The subjects involved in this study were Inpatient Treatment Records (ITR) of patients treated at Walter Reed Army Medical Center (WRAMC). A sample of 260 ITRs was selected randomly. Since all records are eventually completed and sent to the Patient Administration Directorate (PAD), I chose a 14 day period of time and selected every third ITR that was completed during that period.

The dependent variable in the study was total processing time of individual ITRs. The period began at the time a patient was discharged from the hospital and ended when the completed record was delivered to the PAD. The time was measured in days. The dependent variable of total days was recoded into binary nominal data to reflect whether or not the ITR was completed in 30 days or less as required.

There are many other factors associated with each the record of each patient's case and how it was processed. Those factors that could be practically evaluated were measured and considered independent variables.

Using the Julian date, each of the following dates was recorded: Discharge, ITR brought from ward to chart room and record brought to PAD. By simply subtracting the Julian dates, I derived lengths of time for various activities measured in days. These activity periods served as independent variables. The activities included: (A) the time the ITR of a discharged patient remains on the ward prior to going to the appropriate chart room (Ward lag), (b) total time in the chart room and (c) the total time of the entire process from discharge to completion (PAD). This is interval data.

Nominal data was collected to identify the department and the service treating the patient. All of the cases were assigned (by clinicians during treatment) one of six major clinical case codes that are associated with a specific department or service. These included the Departments of Medicine, Surgery (less Orthopeadics), Obstetrics and Gynecology (OB/GYN), Pediatrics and the Orthopaedics Service. These choices are mutually exclusive and categorically

exhaustive. For each of these variables each case was coded 1 if yes and 0 otherwise.

One and only one of three separate chart rooms oversaw the processing of the selected record. The chart rooms were located on the 5th, 6th and 7th floors. Again, nominal data was collected by coding each record 1 if yes and 0 otherwise for each of these possibilities.

Hypothesis testing. The primary purpose of this segment of the study was to describe the system and produce some data that might lead to explanations and a better understanding of the process. However it is possible to predict future performance and attempt to influence the variables of interest by controlling the independent variables. It was hypothesized that then length of time taken to process an ITR is a function of (a) the department treating the patient, (b) the nature of the case and the specialty staff involved and (c) the chart room responsible for processing the ITR. The corresponding null hypothesis was that there is no significant difference in processing time between

departments and any variation among them is the result of chance alone.

It was also hypothesized that the length of time required to process an ITR is a function of which PAD chart room is responsible for PAD functions in the process. In this case the corresponding null hypothesis is that there is no significant difference in processing time between chart rooms and any variation among them is the result of chance alone.

The hypotheses were tested at a 95% confidence level (alpha = .05). These results reflect the 95% confidence level and could only be the result of random chance in 5% of such cases.

Descriptive statistics. A total of 260 cases were included in the sample. They were distributed among all the departments, all 3 chart rooms and all clinical specialties. The Departments of Medicine and Surgery accounted for the vast majority of all cases. Since the same data is used to describe the performance of the system from the perspective of two different groups of users, the data is summarized according to clinical

department (Table 2) and then again by chart room (Table 3).

Inferential statistics. Since the number of cases varied between categories within each variable of interest, it was not appropriate to conduct a two way, three way or any other extension of the basic Analysis of Variance (ANOVA). In two parallel sets of analyses (cases compared between departments and cases compared between floors), a one way ANOVA was performed on the data set, for each of the variables of interest (ward lag, chart room time, total time and percentage delinquent).

When the cases were separated by department and the variance of ward lag among the groups was analyzed, a one way ANOVA, yielded an F ratio of .205. This correlates to a greater than 93% (.9355) probability that the data from the 5 groups was drawn from the same general population and exhibits no appreciable differences in ward lag time between them based on the group to which they belong. In this case we accept the

Table 2. Mean Processing Time by Department

	Ward	s.d.	ChtR	s.d.	Total	s.d.	%Dlq	s.d.
Med	5.18	12.91	54.32	52.57	59.50	57.14	.75	.43
Surg	5.42	8.77	35.91	20.84	41.33	21.14	.70	.45
OB	4.53	5.37	30.84	27.03	35.37	27.18	.46	.50
Peds	2.91	2.39	23.41	13.71	26.33	12.94	.16	.38
Orth	6.14	5.24	63.14	54.33	69.28	58.99	.57	.53

Table 3. Mean Processing Time by Chart Room

	Ward	s.d.	ChtRm	s.d.	Total	s.d.	%Dlq	s.d.
5th	5.95	8.92	35.41	30.37	41.37	31.48	.49	.50
6th	4.50	6.67	36.49	27.64	40.99	27.88	.63	.48
7th	5.45	13.69	55.03	52.77	60.49	57.92	.78	.41

All depts. & floors

	Ward	s.d.	ChtRm	s.d.	Total	s.d.	%Dlq	s.d.
Totl	5.11	10.26	43.51	40.60	48.63	43.48	.68	.47

null hypothesis that ward lag time does not vary as a function of department.

When the chart room time was selected as the dependent variable, the same one way ANOVA technique produced an F ratio of 4.916 which corresponds to a probability of .00078. This exceeds the critical value of alpha (.05) and is considered statistically significant. The null hypothesis is rejected with power and the alternate hypothesis is accepted suggesting that the total time ITRs remain in the chart rooms varies as a function of the clinical department responsible for the record.

By again changing the variable of interest and designating total processing time as the dependent variable, the one way ANOVA yielded an F ratio of 4.471 with a probability of .00165. The general null hypothesis is rejected. An alternate hypothesis that total processing time varies among clinical departments is accepted.

Lastly, when the binary variable describing whether or not the record was delinquent was assigned

as the dependant variable the analysis of variance produced an F ratio of 6.429 which corresponds to a highly unlikely probability of .00006. Based on this, the general null hypothesis is rejected. The alternate hypothesis is that the percentage of a group's records that are completed in excess of 30 days is a function of clinical department.

When the cases were grouped by the chart room that processed the ITR, and the variance of ward lag among the groups was analyzed, a one way ANOVA yielded an F ratio of 0.405. This correlates to a probability of .667 that the data from the 5 groups was drawn from the same general population and displays no statistically significant differences in ward lag time among the groups. In this case, we accept the null hypothesis that ward lag time does not vary as a function of chart room.

By selecting chart room time as the dependent variable, the same one way ANOVA technique produced an F ratio of 6.963 which corresponds to a probability of .0011. This exceeds the critical value of alpha (.05)

and is considered statistically significant. The null hypothesis is rejected. The alternate hypothesis is accepted supporting the position that total time the ITRs remained in the chart rooms varied as a function of which chart room the ITR was processed in.

By again changing the variable of interest and designating total processing time as the dependent variable, the one way ANOVA yielded an F ratio of 6.404 with a probability of .00193. The general null hypothesis is rejected. An alternate hypothesis that total processing time varies among clinical departments is accepted.

Finally, when the binary variable indicating which records were completed in excess of 30 days was assigned as the dependant variable, the analysis of variance produced an F ratio of 6.593 which corresponds to a highly unlikely probability of .00161. Based on this the general null hypothesis is rejected. Acceptance of the alternate hypothesis suggests that the percentage of a groups records that are completed

in excess of 30 days is a function of clinical department.

Summary of processing dates study results. Aside from the time required for the wards to bring the ITRs to the chart rooms, there was tremendous significance when evaluating other measures of how quickly the ITR was processed. In view of this, the general null hypothesis is rejected. The general alternate hypothesis is accepted suggesting that the length of time taken to process an ITR, after arriving in a chart room, is a function of which department treats the patient and which chart room is responsible for processing the ITR. These two series' of ANOVAs indicate that length of processing time generally varies as a function of two independent variables, clinical department and chart room.

The Physician Opinion Survey

Experimental design. To gain a better understanding of how physicians interface with the medical records processing system and identify some of the problems they encounter, I conducted a survey.

Since the most inpatient treatment and ITR processing involves resident physicians, I chose to concentrate on the this group of physicians. They also represent one of the largest segments of the Medical Corps officers at WRAMC. The survey consisted of 30 questions. It included a variety of different sorts of questions including "Yes or No", multiple choice of bipolar opposites and "Check all that apply" types. Some questions focused on the physicians' performance while others solicited their beliefs or their opinions of their leaders' beliefs.

The survey was distributed through the Departments of Medicine, Surgery, Obstetrics and Gynecology, and Pediatrics. Since surveys in general can have low response rates and the subject population are notoriously busy, response rate was a concern. The survey instrument was deliberately limited to one sheet of paper and included a gift of cookies to encourage participation. Notwithstanding these measures the response rate was approximately 20%. Since the survey attempted to measure subjective opinions and beliefs of

the population at large, quantifying the response provided only an approximation of the population's beliefs. For analysis, responses to questions which offered ranges as choices were recoded to reflect the middle of the range. With such broad ranges this served only as a rough estimate which was still quite useful for relative comparisons.

Results, descriptive statistics. Prior to the survey, my primary focus had been on the Narrative Summary report since it pertains to all departments and involves the most numerous and complex transfers of data. The physicians reported that they typically go to the chart rooms 3.44 times each week (about every other day) to dictate and sign records. During their visit they typically dictate 4.36 Narrative Summary reports each time. Ninety three percent of the physicians surveyed indicated that their leaders encourage them to dictate Narrative Summaries and of those responding "Yes", their leaders set a goal of 4.8 days post discharge. They reported that these goals were based on different reasons as follows: (a) Service

Chiefs' policy (41%), (b) accepted department standards (31%), (c) attending physicians' guidance (14%), (d) other reasons including Chief Resident's policy, JCAHO and good medical care (14%), (e) written WRAMC policy (7%) and (f) formal DA Regulations (3%). They felt that they were able to meet their leaders' goals approximately 66% (+/- 5%) of the time. In those cases that they were unable to meet their leaders' goal, they took an average of 10.1 days. Considering the fact that there are some ITRs that have processing times that are in excess of 60 days (double the standard) the survey queried the physicians about the longest delay in dictating that they had experienced. They indicated that their longest delays involved the following factors various degrees: (a) dictation lost (41%), (b) lost chart (34%), (c) no time available (34%), (d) other, primarily "record slow to box" (13%) and (e) delay in supporting documents (10%).

The physicians also indicated how well they felt that the system supported them in their records processing tasks. They reported that Narrative Summary

reports were ready for their review 8.53 days after dictating and that other reports (i.e. Op Reports, air evacuation requests, etc.) were similarly ready for their review in approximately 9.61 days. They also reported that their dictations must be "redictated" approximately 13.45% (8.45 - 18.45%) of the time. A more complete summary of responses can be found in Table 4.

Since some cases may involve more than one physician, ITRs can be misdirected to the wrong physician. The respondents indicated that this occurs approximately 12.40% (7.40 - 17.40%) of the time. There was relatively little variation in these responses as shown in Table 5. The respondents rated transcription support by indicating what percentage of their transcriptions were returned for correction. They estimated that 17.11% (12.11 - 22.11%) were sent back. Again, there was low variability in the responses as shown in Table 6.

ITRs placed in physician boxes without all of the supporting documentation included must be sent back to

Table 4. Reported Frequency of Redictation

Range of Frequency	Frequency Reported
0%-10%	48%
11%-20%	40%
21%-30%	13%
31%-40%	0%
41%-50%	4%
51%-100%	0%

Table 5. Reported Frequency of Misdirected ITRs

Range of Frequency	Frequency Reported
0%-10%	52% (of the time)
11%-20%	36%
21%-30%	12%
31%-40%	4%
41%-100%	0%

Table 6. Reported Frequency of ITRs Needing Correction

Range of Frequency	Frequency Reported
0%-10%	52%
11%-20%	11%
21%-30%	13%
31%-40%	4%
41%-50%	4%
51%-60%	0%
61%-70%	0%
71%-80%	4%
81%-90%	4%
91%-100%	0%

the chart analysts. They reported that this occurs in 20.21% (15.21 - 25.21%) of all cases (Table 7). Physicians indicated how serious they felt the problem of missing documents was. The Pathology Report drew the most responses as shown in Table 8.

Five questions focused on the physicians' perception of their leaders' beliefs and the leaders' actions. In the respondents' estimation (Table 9), their leaders knowledge of the physicians' efforts in dictating and signing was rated highly.

In the physicians estimation, their timely dictating and signing was of varied importance to their leaders. Overall, it was reported to be relatively important as shown in Table 10. The respondents indicated that they are complimented or rewarded occasionally, based on their performance in dictating and signing. More complete summary of responses can is shown in Table 11. Conversely, the respondents indicated that they are less frequently criticized or otherwise penalized by their leaders based on their

Table 7. Reported Frequency of Missing Documents

Range of Frequency	Frequency Reported
0%-10%	48%
11%-20%	16%
21%-30%	8%
31%-40%	4%
41%-50%	12%
51%-60%	4%
61%-70%	0%
71%-80%	4%
81%-90%	4%
91%-100%	0%

Table 8. Reported Frequency of Missing Reports

"O" - Occasionally missing

"S" - Serious problem with missing reports

"F" - Frequently missing

	O	F	S	Total
Type of Report				
Pathology	27%	13%	13%	53%
Catheterization	7%	3%	0%	10%
Radiology	10%	10%	0%	20%
Operative	17%	3%	3%	23%

Table 9. Physicians' Estimate of Leaders' Knowledge

43%	Almost always have up to date knowledge of their work.
43%	Regularly have some idea of their recent efforts.
7%	Occasionally have some estimate of their work in dictating.
7%	Seldom has knowledge of their efforts or performance in this area.

Table 10. Reported Importance of Dictating and Signing

0%	Not at all
0%	Very little
14%	To some extent
75%	Very much
11%	Most of all

Table 11. Reported Frequency of Compliments/Rewards

15% Never

15% Seldom

41% Occasionally

18% Regularly

11% Often

Table 12. Reported Frequency of Criticism/Penalties

18% Never

32% Seldom

29% Occasionally

18% Regularly

4% Often

Table 13. Reported Influence on Individual Evaluations

23% Not at all

19% Very little

42% To some extent

12% Very much

4% Most of all

performance in dictating and signing ITRs (Table 12). Most of the responding physicians felt that their performance in this area would influence their performance evaluations. As show in Table 13, few indicated that it would influence the evaluation "very much" or "most of all".

Using three related questions, the physicians indicated what measures their leaders use to promote timely records processing, how effective these measures are, and what other measures might be effective. As shown in Table 14, general announcements, individual phone calls and electronic mail messages were reported to be the most common measures in practice.

When asked in general what rewards available to their leaders should be used more frequently for them and their peers, the physicians responded with a wide variety of options as shown in Table 15.
The most notable barrier reported was "waiting for wards/chart rooms to consolidate papers [into ITR]."

Two inventory questions asked the respondents what reasons caused them to strive to dictate and sign

Table 14. Measures to Encourage Timely ITR Processing

"A" - Measure currently in practice

"B" - Measure in practice and reported to be effective

"C" - Measure not reported to be in practice, but thought to be potentially effective

	A	B	C
General Announcements	86	41	0
Individual phone calls	34	17	0
EMail	34	13	3
"One-on-one" compliments	24	17	13
Reprimands	17	0	0
Individual contacts	13	13	3
Awards	13	3	7
Recognition in meetings	13	3	3
Counselling	13	3	3
"Work waiting list"	13	3	3
Extra "trips"	7	3	10
Tracking performance	7	3	0
Extra duty	3	0	7

Table 14 (continued).

	A	B	C
Loss of "trips"	3	0	7
Preferential scheduling	0	0	10
Comments on evaluations	0	0	10
Letters of Commendation	0	0	3

Table 15. Percentage of Residents Recommending Greater Use of Currently Available Rewards

34% Informal compliments and acknowledgement of their efforts.

31% Time off.

24% Favorable comments on regular evaluations.

7% Letters of commendation.

10% Department of the Army awards.

13% Favorable duty assignments/schedules.

31% Professional education opportunities (local/TDY training).

Table 16. Reported Barriers to Narrative Dictation

3% Preparation required by physicians

3% Lack of incentives

72% Waiting for wards/chart rooms to consolidate papers

34% Conflicting requirements/higher priorities

24% Time required to dictate

3% Chart room noisy and far away.

The responding physicians rated the conditions offered in the survey as some of the most significant barriers to dictating narrative summaries (Table 16). quickly (Table 17) as well as the reasons for delaying dictation and signing (Table 18). Most chose several reasons in each inventory.

The most respondents indicated that when given records for signature, they generally review the entire ITR for errors (Table 19). The respondents indicated that this review and signature usually takes less than 2 minutes (Table 20).

Hypothesis testing. The majority of the responses provide some indication of how the physicians feel and what they believe are important issues. Since many of the answers were not anticipated, the range of answers and the choices offered do not lend themselves to more detailed analysis. However, it was posited that physician performance was related to their perception of their leaders' attitude toward the task. Subjects for the study were resident physicians assigned to WRAMC. In this hypothesis, the dependent

Table 17. Reasons for Dictating/Signing Quickly

76% The cases are fresh in their minds and they recall the details better.

58% It helps provide continuity of care for future treatment.

55% It provides a formal record the course of treatment.

45% Delinquent records would reflect badly on this system, their department and WRAMC.

48% It is required by the JCAHO.

41% It is required by their immediate supervisor.

31% It serves as legal document to defend them and the hospital if necessary.

27% It helps them insure that they have completed the intended course of treatment.

27% It is required by Army regulations.

20% Other people involved with processing the records must wait for the physician's work.

20% It is the Commanding General policy.

17% It adds to the body of knowledge available to researchers.

Table 17 (continued).

10% It enables QA to conduct more timely occurrence screening.

7% It serves as the basis for third party reimbursement.

Table 18. Reasons for Delaying Dictation/Signing

68%	They do not have enough time.
48%	It takes time away from direct patient care.
24%	It provides no personal or professional rewards.
17%	They have other duties, beyond patient care, which are more important.
13%	It takes a considerable amount of time to go to the chart room.
13%	They have so much dictating and signing to do, it seems like an overwhelming task.
13%	The system is ineffective and their efforts to expedite it would not make a difference.
13%	It usually involves older cases which are not fresh in their mind.
10%	It provides no benefit to the patient.
3%	They never know if there is work for them.
3%	They do not feel it is their responsibility.
3%	The information is already recorded in the form of notes. It won't be lost.

Table 18 (continued).

3% They prefer to think about the cases for some time first.

0% Have difficulty in putting their thoughts into the proper report format.

0% Dislike the chart room environment.

Table 19 Resident Review of ITRs

24%	Just sign it.
17%	Make sure it is the case that they had in mind and that it is about the right length.
7%	Check any unusual aspects of the case that might have problems.
83%	Review the entire report for errors.
0%	Compare the report to notes and consider improving the report.

Table 20. Reported Time Required for Review/Signature

18%	< 1 min.
48%	1-2 mins.
30%	2-5 mins.
4%	5-10 mins.
0%	>10 mins.

variable was the reported estimated days taken to dictate Narrative Summaries. It was measured by the physicians' response to question number 2 in days. The ranged responses were recoded as the mid point in the range.

Questions 10, 11, 12 and 13 corresponded to the physician's expressed perception of (a) leader knowledge, (b) importance of the task, (c) frequency of compliments, and (d) frequency of criticism respectively. These questions offered choices describing progressively greater degrees of these independent variables. The responses were assigned numerical values (i.e. 1 - 5) to be used for analysis.

The general hypothesis of this study was that physician performance in medical records varies as a function of their perception of their leaders beliefs or actions towards the physician. The null hypothesis was that no difference exists among the performance of physicians regardless of their perception of their leaders beliefs or of how their leaders behave toward the physicians. Four more specific Secondary

Hypotheses (SH) allowed better evaluation of the general hypothesis:

1. Secondary Hypothesis 1: Days prior to transcription varies as a function of the physicians perception that his leaders are knowledgeable of his performance.

2. Secondary Hypothesis 2: Days prior to transcription varies as a function of the physicians' perception that his timely dictating and signing was important to his leaders.

3. Secondary Hypothesis 3: Days prior to transcription varies as a function of the how frequently physicians are complimented or otherwise rewarded by their leaders regarding their performance in completing medical records.

4. Secondary Hypothesis 4: Days prior to transcription varies as a function of the how frequently physicians are criticized or otherwise penalized by their leaders regarding their performance in completing medical records.

The null hypothesis for each of these was that days prior to dictation does not vary as a function of the physicians' perceptions of his leader's beliefs or as a function of the leaders rewarding/penalizing behavior toward the resident physician in regards to completing medical records. The null hypothesis states that there is no difference between high performers and poor performers and that any observed variation is due to random chance alone.

The hypotheses were tested at a 95% confidence level (alpha = .05). The results reflect this 95% confidence level and could only be the result of random chance in 5% of such cases.

Results, inferential statistics. The dependent variable, "days", ranged from 1 to 15 with a mean of 4.88 and a standard deviation of 5.26. The independent variable, "knowledge", ranged from 1 to 4 with a mean of 3.21 and a standard deviation of 0.91. The independent variable "importance" ranged from 3 to 5 with a mean of 3.96 and standard deviation of 0.53. The independent variable "compliment" ranged from 1 to

5 with a mean of 2.96 and a standard deviation of 1.15. The final independent variable "criticized" ranged from 1 to 4 with a mean of 2.48 and a standard deviation of 1.04.

Since both the dependent and independent variables are continuous rather than binary, each of the secondary hypotheses was tested using Pearson's product moment r as a measure of covariation. They were calculated as follows:

SH1 - Y=days, X=knowledge; r = -.488,

SH2 - Y=days, X=importance; r = -.436,

SH3 - Y=days, X=compliment; r = -.339,

SH4 - Y=days, X=criticize; r = .443

The critical value for comparing these observed distributions tc an expected two tailed normal distribution (N=25, alpha=.05) is +/-.395. CV (N=25, alpha=.01) = +/-.505.

In the case of Secondary Hypothesis 1, the value of Pearson's r (.488) greatly exceeds the critical value (.395) and approaches the more stringent critical value for a 99% confidence interval (.505). Based on

this difference, the null hypothesis (y / f(x)) is rejected. The alternate hypothesis (y = f(x)) is accepted such that number of days prior to dictating Narrative Summaries varies as a function of the physicians' perception of how knowledgeable his leaders are regarding his performance. The correlation demonstrates a strong negative covariation. This could be restated as saying that time prior to dictating decreased as perceived leader knowledge increases.

Similarly, the observed value of r (-.436) in SH2 exceeded the critical value of r expected for a random sample (+/-.395). Only in less than 5% of all samples will such results occur due to chance alone. The null hypothesis was rejected with power and the alternate hypothesis, Secondary Hypothesis 2 is accepted. As in SH1 the strong negative correlation suggested that the time prior to dictating decreases as perceived importance of the task to the leader increases. Thus with greater than 95% confidence one can state that the number of days prior to dictation varies as a function

of physicians' perception of the importance of dictating and signing records.

In the case of Secondary Hypothesis 3, the observed r value (.339) did not quite exceed the critical value (+/-.395). The null hypothesis was accepted. The no difference model applied to SH3 holds that the number of days prior to dictation does not vary as a function of how often they are complimented or otherwise rewarded by their leaders based on their performance in completing ITRs. Although there was a marked tendency for negative covariation between delay in dictation and frequency of compliments, the relationship was not statistically significant within the parameters of this evaluation.

Lastly, the test of Secondary Hypothesis 4 showed that the r value of the observed distribution (.443) far exceeded the critical value (+/-.395) of a random distribution. The null hypothesis was rejected and the alternate hypothesis postulated in SH4 was accepted. In greater than 95% of such samples the number of days prior to dictation varies as a function of the

frequency that physicians are criticized or otherwise penalized by their leaders based on performance in completing medical records. This robust positive correlation indicated that as physicians delay longer in completing ITRs, they are criticized more frequently.

Summary of physician opinion study results. The null hypothesis that there is no difference among the performance of physicians, regardless of their perception of their leaders beliefs or of how their leaders behave toward the physicians, is rejected. Since three of the secondary hypotheses were accepted and the fourth was rejected after demonstrating considerable correlation, the general hypothesis that physician performance in medical records varies as a function of their perception of their leaders beliefs and actions towards them, is accepted. Since these results could only occur by random chance alone in less than 5% of such samples, this position can be considered 95% accurate.

Transcription Time Study

The previous studies revealed a great deal about the system and prompted a focused examination on the transcription process.

Experimental design. In an effort to estimate the time required for dictation and transcription I collected a small random sample of data to estimate these amounts of time with in the lager "chart room time" period. In order to obtain data that was random and relative to the first study, I selected two periods. The first was the same 14 day period as the original study 1-14 January 91. Since the ITRs studied were turned in to the PAD during that time, it is likely that the patients were discharged some time before and that their cases were dictated and transcribed earlier. The average Julian date of discharge for the ITRs examined in the first study corresponded to 21 November. Therefore, I chose 14 - 27 November 90 as a second 14 day period. I selected Narrative Summaries and Operative Reports that were completed during these periods.

Results. During the January period, Narrative Summaries were completed an average of 1.77 days after dictation, and operative reports were completed an average of 1.21 days after dictation. During the November time period, Narrative Summaries were completed an average of 1.21 days after dictation. In all, data from 92 cases was examined.

Data was not obtained regarding Operative Reports for the November period. Using the control terminal for these searches required 3-5 minutes and a complex series of commands for each case. After obtaining the previously summarized data, the system responded to this moderate volume of searches by gradually stopping all management functions and eventually failing entirely. For several hours the complete digital dictation system was inoperative. No dictations could be recorded, and no work could be down loaded to in house or contracted transcriptionists. After this experience, I considered it best not to unnecessarily tax the system for this data and recommended that others do the same.

Transcription report. Another measure of system performance is a report compiled by the Transcription Service and the DMAA/PAD. It records the daily inputs and outputs (measured in lines of printed text) of the system. Inputs include newly dictated jobs and backlogged jobs. Outputs include the documents transcribed by the WRAMC Transcription Service and the contracted transcription service. Any difference between daily and outputs represents work that is backlogged. The average daily outputs and backlogs have been calculated for each week in November, December and the first two weeks in January (Table 21). The tremendous backlog of early November was reduced using overtime funds to pay selected WRAMC secretaries to supplement the Transcription Service staff.

Idle ITRs Review

Since the time for transcription represented only a portion of the total "chart room time" identified in the first study, I investigated another major activity that occurs during the same period. Physician review

Table 21. Average Transcription Backlog & Output

Week Beginning	Daily Output*	Daily Backlog**
5 Nov	7,118	34,577
12 Nov	6,804	15,509
19 Nov	4,157	4,255
26 Nov	5,352	3,681
3 Dec	5,048	2,886
10 Dec	4,555	3,168
17 Dec	5,615	6,407
24 Dec	3,202	8,745
31 Dec	4,269	6,096
7 Jan	4,630	7,065
14 Jan	5,582	5,022

* Output is the number of lines of printed text transcribed by all WRAMC and contract transcriptionists each day.

** Backlog is an estimate of the number of lines of text that has been dictated into the system but has not yet been transcribed.

and signature occurs twice during this process; once by the resident physician and again by the attending physician. Since no data base contained a reliable record of how long this took for the cases in the first survey, only an estimate could be accomplished. By all subjective opinions, the ITR processing system functions better today than it did last year and noticeably better than earlier this year. One would naturally expect that performance in a sample of ITRs currently being processed would be higher than the performance of those in the January ITR study.

The best source of current information available on how long review of these ITRs took was in the ITRs themselves. There was potentially one fundamental flaw in the randomness of the sample.

One chart room used a system of stamps on an insert to the front cover. This system indicated the date the record was available for the resident's review, the date it was sent to coding (signed by the resident) and the date it was available for the attending's review. In other chart rooms, only the

date that the ITR was last made available for review could be determined.

Results. Based on a sample of 51 of those records which were currently waiting for review and signature, the average ITR had been awaiting review and signature for 14.4 days. This represented 61% of all records examined. The remaining 39% were awaiting dictation, movement to coding or some other action. Of the 28 that had been signed previously, the first review and signature by the residents was accomplished in an average of 7.6 days.

Systems at Other Hospitals

Since the medical records department is found in all hospitals, one can learn a great deal by studying how other hospitals meet the same JCAHO standards under varied conditions. I visited other hospitals to research how their systems resembled or differed from WRAMC's and to compare the results produced by these systems. These sites included public, private, large, and small hospitals in the Washington, D.C. area.

The National Naval Medical Center (NNMC), Bethesda, Maryland provided a good comparison. Both WRAMC and NNMC are medical centers operated by the DoD, with sizable teaching programs and located in the Greater Washington, D.C. area. Patient administrators at NNMC have also experienced relatively high delinquency rates. Like WRAMC, the NNMC uses a digital dictation system to record physicians' reports for transcription. This system serves the organization well and has reduced time spent managing audio cassette tapes. In contrast to WRAMC, the NNMC has no internal transcription service and relies solely on three separate contracted transcription services. Leaders reported a wide variation in the performance of the three. Not surprisingly, the best performing contractor was also the most expensive. The worst performing contractor had lower prices but their poor performance in effect made them the most costly. Dictation transcription jobs are sent to the contractors using conventional telephone line and modems just as WRAMC does with its off-site contractor.

Completed transcriptions are sent back to the NNMC using telecommunications and printed on plain paper at a central location at NNMC. This system works well and saves the time and resources required to physically transport the paper that bears the information.

The NNMC uses different tools to manage the processing of inpatient treatment records. They have recently begun using commercial software in the chart tracking, deficiency management and management reporting processes. The Medical Record Director was satisfied with the system's ability to provide useful information. He also felt that the system interface was user friendly, efficient and reduced wasted time. His evaluation of the management reporting capability of the system was a mixed review. Although it is far superior to the time consuming manual system it replaced, it does not produce many of the reports he feels that management should receive. Other software packages available produce a more comprehensive and valuable variety of management reports. The utility of management reports was somewhat bothersome to him. The

limited reports he does produce are still quite valuable but are seldom used. One must wonder if better reports would be used more.

I also visited two civilian hospitals to gain some insight on how their systems performed. Two important differences between military and civilian hospitals have direct bearing on processing medical records. First, civilian hospitals rely on medical records as a basis for reimbursement, while military facilities primarily work with a budget allocated by higher headquarters. Second, the physicians who practice at civilian hospitals are members of an open staff. They are somewhat independent of the hospital. Conversely, military physicians are formal members of the organization where they practice and comprise a closed staff.

The first was a very successful hospital located in a less affluent section of Washington, D.C. The medical records section was large, well staffed, and outfitted with fairly modern equipment including a digital dictation system for on and off-site

transcription. The director of the Medical Record Department reported a lower delinquency rate than either of the military facilities described, but was dissatisfied with her hospitals performance. Inpatient records at this hospital typically involve several physicians who are responsible for completing the medical record. None of them have a Resident-Attending relationship. Charts must be available to all of these physicians at the same time. Thus, inpatient records are not placed in a single physician's "box" for action. The staff retrieves records for the physicians on demand. Records do not routinely leave the records room and lost records are not a serious problem. This hospital uses the same automated record tracking and deficiency monitoring system as the NNMC and report similar dissatisfaction with the reports. The basic reports at this hospital are used to a much greater extent than at the NNMC. Strict standards are set for physicians to complete their records. Operative reports must be dictated within 48 hours and no inpatient records may be incomplete over 30 days.

Physicians who fail to meet these standards are prevented from using the OR or admitting patients accordingly. The hospital also offers many incentives for the physicians. Those in compliance are given gift certificates or meal passes for the hospital cafeteria. Hospital leaders also use other incentives. They encourage physicians to get to the records quickly by hiding certificates for tennis balls, golf balls, dinners, dollar bills and lottery tickets in the record folder. Since there are multiple physicians working with the same record, it pays to get the record quickly. One strategy that did not work was offering refreshments in the records department. Many physicians would "eat and run" without doing any work on the inpatient records they had outstanding. Hospital leaders also tried sending floral arrangements to the worst performing physicians' offices as a kind and poignant, if not dramatic, reminder to come to the hospital to correct inpatient record deficiencies. This was not effective either. The Hospital Record Department staff devote a large portion of their time

placing telephone calls to physicians' offices reminding them to come to the hospital to work on their incomplete records. Since many of the physicians maintain offices so far away from the hospital, travel time represents a significant barrier to them. The Hospital Medical Record Department Director finds that one of the best ways to promote timely physician cooperation is to make the task as simple and efficient as possible for them. The physical surroundings in the records area is comfortable, the dictation equipment is simple as well as readily available and staff are always made available to assist physicians in obtaining the appropriate records and correcting the deficiencies.

The second civilian hospital I visited was located in a more affluent suburban county. As with the urban hospital there are no teaching programs. In contrast to the urban hospital, this hospital is experiencing considerable difficulty with inpatient medical records. This hospital uses audio cassette tapes for recording dictations. Dictations are transcribed by a

combination of in-house and contract transcriptionists. This medical records department has a different automated deficiency and chart tracking system. They do not use it to its fullest potential since it requires a great deal of data entry and the staff time available is limited. Few management reports are generated. The hospital has established medical record standards for physicians. However, these standards are rarely enforced since the physicians can easily rebut any accusations of delays on their part by citing the regular delays they experience with the Hospital Medical Record Department. The 200-250 bed hospital currently has only one coder and one other medical record technician. Records must be requested by phone prior to coming to the hospital and remain in a physicians "box" for 24 hours before being refiled. Records are often unavailable since they are out for different studies, PRO copying, with another physician or at a host of other locations. The Director of the Medical Record Department reported some frustration

working with the medical staff and a decreased budget.

Interviews

I interviewed several people at WRAMC in an attempt to better understand the process, the timing of actions, and the thoughts of the users. I spoke with the Director of the Patient Administration Directorate (PAD), Medical Record Administrator, Transcription Supervisor, several transcriptionists, Chart Room Supervisors as well as department and service chiefs.

One matter that often came up was the issue of "lost charts." The fact that an ITR is physically lost does not relieve the hospital of the responsibility of getting it to the PAD 30 days after discharge. ITRs are reportedly lost most frequently in cases where the patient is placed in the Medical Holding Company. Although the soldier is no longer occupying a bed of an active treatment ward, he is still carried on the rolls as an inpatient under jurisdiction of the Medical Holding Company. During this period his/her ITR is often lost due to mishandling or misrouting. This infrequent occurrence represents the most frustrating

failure of the process for the physicians, MRTs and, transcriptionists.

The considerable lag time in bringing ITRs from the wards to the chart rooms appears to be associated with the schedule of MRTs on the wards. Many patients are discharged during normal duty hours. At that time MRTs perform a myriad of duties. During the evening shift, some wards are not staffed with MRTs who prepare the ITRs and transport them to the chart rooms. Other wards are staffed with MRTs in the later shifts, but the ITR processing tasks are not high priority assignments.

The extent to which transcribed dictations are returned to the Transcription Service is not clear. The Transcription Supervisor states that it is her policy that all products requiring correction should be handled by her. She reports that each week 2-3 documents are returned. The physicians responding to the survey estimated a much larger portion are returned. The chart room supervisors who serve as an interface report a level somewhere in the middle, (2-5

per day). In any case the response time on these typically minor corrections is very short. All MRTs interviewed stated that these corrections are always made the same day if not "while-you-wait."

Chart Room Supervisors expressed tremendous frustration with the physicians. Supervisors estimated that ITRs typically remained in the boxes for about 7 days awaiting dictation. They also estimated that the ITRs remained in the physicians' boxes for 10 - 14 days for each of the two commonly required signatures.

Department and service chiefs expressed concern over the entire system. They were quick to discuss the value of timely ITR processing and their frustration in striving to meet the standard. Each of them cited one service chief whose service has a nearly perfect record in completing ITRs. It was his peers' opinion that he had so much success because of the way he acted, the way he communicated his desires to his subordinates and the amount of time that he personally devoted to the task. His peers did not appear at all envious of him or his accomplishments. Rather, he was viewed as an

eccentric who along with raving about doorknobs and ceiling tiles, had assumed a one man crusade to process ITRs quickly. He and his service received little if any formal recognition, no additional resources as a reward for his service's performance, only the satisfaction that he had done the job. At the same time, his peers reported no hardship or undue pressure to improve their performance in processing ITRs. It was viewed as a difficult task supported by a mediocre system. Some degree of failure seemed to be expected and has historically been accepted.

Chapter III - Discussion and Analysis

During my research it became clear that the medical record processing system at WRAMC is exceptionally complex. There are numerous different paths an ITR may follow based on the patient, the treatment provided and the staff involved. Since the product varies so much, system performance has been somewhat difficult to evaluate.

There has been considerable improvement during the course of this study which coincides with a change in transcription contractors, preparation for a JCAHO inspection and the combined efforts of a MHA trained, field grade, Medical Services Corps project officer, a senior NCO and a Registered Records Administrator. Since of the data was collected and analyzed over the course of several months, it may not reflect the precise conditions at WRAMC at the present time. However, the system still produces some unsatisfactory outcomes (delinquent records) on a regular basis.

Analysis of the Medical Record Weekly Report

This report is the most comprehensive on-going summary of data available. It provides mangers with the most useful data collected by PAD. Since it is done on a weekly basis, it is relatively current and provides timely feedback to leaders. The recent addition of a the "by name inventory" supplement gives leaders a listing of how many delinquent ITRs are physically in each physician's box. These tools help leaders to better focus their efforts and monitor progress. The report provides summary data and requires its recipients to compare or process these raw facts, analyze the resulting information and draw conclusions. The actual number of dispositions or number of records incomplete, delinquent or completed is only truly useful when taken in the context of the other numbers. The percentage of ITRs that are delinquent represents such a comparison. The numbers for each of the prior three report periods are presented and allow recipients to do trend analysis of their performance. To obtain a valid estimate of changes in performance, one must first account for

changes in conditions such as the relative amount of work to be done (i.e. total incomplete ITRs and total dispositions). Again this implies that one must first normalize the raw numbers through calculating percentages or some other method that facilitates comparison and in turn evaluations and judgments. Another useful analysis of this normalized information would be a calculation of the standard deviations of the different performance rates of the services. Services falling more than two standard deviations from the mean would definitely be outliers and be likely candidates for future command interest.

Periods of high performance, correspond with periods of increased command emphasis. Additional resources in the form of management effort and clerical support were provided as needed. The period where the performance appeared to have decreased corresponds to the period of time when the data collection process was improved to more accurately monitor the system. Much of the administrative and logistical support for the hospital was reorganized during this same period. The

associated new relationships and duties likely lead to many of the temporary inefficiencies reflected by the statistics. The periods of high performance demonstrate that the system's current procedures can produce results that meet the JCAHO standards, although the cost of this performance in terms of other tasks or missions is unclear.

Analysis of the Processing Dates Study

The most frequently used reports associated with the system are the individual chart room reports of ITR status. Each of the three chart rooms maintains its own separate database dates, names and codes pertaining to the processing of each record that passes through that chart room. These databases serve as a very satisfactory internal report for the chart room MRTs. However, for the most part they consist of raw data pertaining to a single ITR. There does not appear to be any way of producing (a) cumulative processing time information for different steps in the process, (b) summary statistics for groups of records, (c) performance profiles of selected departments, services

or individual physicians. Another shortcoming of these databases is that they have no means of integration.

This scarcity of specific management information prompted the quantitative measurement of common critical periods in the process. This study was rather difficult to complete since all of the information used was only available through a combination of many sources. Admission and discharge dates were taken from the Composite Health Care System (CHCS). (CHCS is an automated DoD medical information system). Many key dates in processing and most of the codes associated with the case and clinical setting were collected from the three chart room databases. Surprisingly, just obtaining reports covering the same period of time from the three independent chart rooms was very difficult. Although each of the systems uses the same software, they have evolved separately. Since these databases were created for internal use, each chart room maintains a different combination of the original fields based on what they have found to be useful and time effective to enter. Even the format of some

fields vary. While one records dates with a traditional American "month, day, year" format, the others use the military "day, month, year" format. Such differences would have to be eliminated if these systems were ever to be integrated. Although the chart room MRTs consistently record the dates ITRs arrive and are ultimately delivered to PAD, they do not track all of the dates related to the concurrent process of transcription. Many of these dates (dictation, assignment to transcriptionist and completion) are available from the digital voice recording systems management reports. In all, data was collected from five different computer systems and manually entered in to a sixth microcomputer for statistical analysis. The descriptive and inferential statistics generated in this study should prove useful to managers. Unfortunately, continually obtaining this information with the methods used here would be impractical. This condition suggests that the current information system does not meet the needs of the organization.

The 5.11 day ward lag is a serious concern. It is a common problem for the majority of the ITRs processed. The different averages for the different departments are noteworthy in that the department with the lowest ward lag is lead by the Chairman of the Medical Records Committee. The wide variation in ward lag (standard deviation = 12.26 days) which is double the average ward time, suggests that there is not a standard or even similar schedule for process that the many different wards follow. The timing of ITR delivery to the chart rooms appears to be on a random basis. What is particularly alarming is that it is well known that the standard for wards to turn the ITR over to the chart rooms is one day. The inferential statistics indicate that there is no significant variation of this delay among the clinical departments or the different chart rooms. This suggests that none of these groups has successfully influenced the appropriate ward(s) to expedite the process. One explanation for this may lie in the fact that wards are run by the Department of Nursing, which is independent

of the other clinical departments of physicians and the Patient Administration Directorate. Since the staffing of MRTs on the wards is limited, some deviation from the standard might be expected. Exceptions would also be expected for weekends and holidays, but a 5 day delay is excessive. I found no substantial explanation. "Lack of time" and "more important tasks at hand" were the most common reasons for the delay. Since the wards bear little responsibility for the medical record processing system, it appears that they have little incentive to expedite this critical task at the expense of other tasks that they will be judged by.

The chart room time (43.51 days) is by far the largest portion of time for the total processing time (48.63 days). Again the wide variability shown by the standard deviation (40.60 days) of the chart room times corresponds to the wide variety in complexity of the ITRs being processed. A precise breakdown of the component activities was not possible. Subjective appraisals of experts and this researcher estimate that the amount of time that ITRs are idle awaiting review

and tracking actions is significant. Delays in each tracking action (collection by analysts, changing record covers, date stamping and especially data base update) may range from less than an hour to more than a day. Even if the prerequisite ward lag time was completely eliminated, the chart room time alone would still be in excess of the 30 day standard. The analysis of variance showing significant variation among clinical departments and chart rooms, supports the position that insurmountable universal problems do not prevent some groups from performing significantly better than others.

Other valuable information can be taken from the descriptive statistics of the different processing times and delinquency rates. Since this type of information is not generated on a routine basis, hospital leaders, heads of many clinical departments and chart rooms supervisors may not have such a quantitative estimate of their performance in processing ITRs. This information would be particularly valuable if it could be gathered on a

continual basis and the resulting trends analyzed. The most valuable lesson learned from this quantitative study is that WRAMC has a lot of data available but it is not integrated, analyzed and presented as usable information that can serve as the basis for management decisions.

Analysis of the Physician Opinion Survey

The fact that only 20% of these busy professionals responded was disheartening but not surprising. One might suspect that those who did respond differed from the group that did not respond. This difference may be that one group is more conscientious than the other. I suspect that those that responded were more interested in the medical records processing system or felt very strongly about their experiences with the system.

The responses regarding source of the standards for processing was interesting in that the top three answers were rather proximate authorities (Service Chief, Department Policy & Attending Physician). Standards set by the Hospital Commander and the Department of the Army, although more authoritative,

were not as well known and were thus less common responses. This suggests that the first line supervisors, Department Chiefs and especially intermediate level Service Chiefs enjoy a great deal of influence over the resident physicians and their performance.

The average goal for dictation of Narrative Summaries of 4.8 days post discharge may seem rather lax, but given the reality of the current 5.11 day ward lag, this goal seems reasonable. The circumstances surrounding the outliers with very long processing times involved lost charts and dictations. This opinion agrees with the views of others that I interviewed.

The questions related to the support that the chart rooms provide were somewhat discouraging since they indicated less than outstanding service. The physicians estimate that dictation turn around time was in excess of 8 days. If correct, this would represent a considerable period of time and a focus for management efforts.

The physicians reported a 12 to 22% "Returned for correction" rate which was surprising and did not correspond to the opinions of the Chart Room Supervisors or the Chief of the Transcription Service. This may be in part to the nature of experiences of the individuals who chose to respond to the survey or the biases of the latter mentioned supervisors. The estimate that ITRs are directed to the wrong physician for action 7 to 17 % of the time was considered somewhat exaggerated by the Chart Room Supervisors who recognized this as a valid concern. The most frequent and serious problem identified was the estimate that 15 to 25% of ITRs are returned to the Chart Room Analysts due to lack of required documentation. The most common of these missing documents is the Pathology Report. While some supervisors have expressed doubt about the necessity of including the Pathology Reports prior to action by the physicians, the physicians have expressed a strong desire that these reports be included much sooner. Earlier in 1991, these reports were produced in the Laboratory and disseminated to wards and chart

rooms. These mixed batches were then sorted and filed into the correct record. The daily volume of these reports is quite extensive. They are now retrieved from the CHCS electronically as needed in the chart rooms.

The statistical significance demonstrated between the variation in physicians' performance in processing ITRs and their perception of their leaders' beliefs may in part hold the key to this management challenge. The results of this analysis support the earlier assertions that there is variability among departments and that resident physicians are strongly influenced by their leaders. The results indicate that where leaders express their feelings that ITR processing is important and reinforce this position by demonstrating an interest in the residents' efforts in processing ITRs, the ITRs are completed significantly earlier.

The correlation between frequency of rewards and decreased processing time would surely have been significant if the inference were based on a more extensive sample where N was larger. Although

statistically insignificant in this limited study, this correlation should not be ignored by leaders. The relatively lower level of correlation observed may be due to the possibility that leaders do not compliment or reward good performance to a great extent. The fact that there was a very strong positive correlation between frequency of criticism or penalties and completion time is puzzling. This would suggest that leaders do indeed criticize or penalize residents based on poor performance but that these measures are more notable than the leaders' complimenting and rewarding behavior.

The involvement, in whatever manner, of leaders in this process appears to be very important and should be considered as a key to improvement. The answers to the questions relating to what methods of promoting timely ITR completion were in use and there effectiveness were interesting. The top three methods reported in use were general announcements, phone calls and electronic mail messages. Each of these measures was rated as effective by half or less of those responding. The

only two measures that were rated as effective by more than half of the residents were one-on-one compliments and other individual contacts.

The respondents also indicated that there were some measures not in practice in their service that may be effective. The top responses (10% or more) were: (a) one-on-one compliments, (b) extra [professional development] trips, (c) preferential scheduling, and (d) comments on evaluations. Not unlike other subordinates, the physicians appear to respond to compliments and individual contact. At the same time they indicate more rewards would be effective in promoting timely ITR processing. In general the "rewards" they wish to receive more frequently appear to be reasonably available. "Informal compliments and acknowledgement of their efforts" (43%) was the top answer and would not "cost" the organization anything. "Professional education opportunities" and "time off" were both cited by 31% and would require some resources, but may prove to be powerful motivators to improve performance, production and earn even more

resources for the organization. The fourth most frequent response, selected by nearly a fourth of those surveyed, was "favorable comments on regular evaluations". Again, this would not cost anything, and yet could easily be used to recognize individuals who achieve the important goals that their leaders set for them.

Analysis of the Transcription Time Study

The digital voice recording system is capable of producing management reports. The system manager can easily review the productivity of individual transcriptionists and other measures of productivity such as total number of lines dictated. Another useful report would track the elapsed time of processing each job from dictation through assignment to completion. Additional notes of how many times the report had to be further amended would also be pertinent to maintaining quality control. However, it is currently configured as a stand alone database. It is difficult to fully integrate its data so, the system's utility as a management tool is limited. We should not forget that

the digital dictation system has produced superior results in managing dictation and transcription which is its primary function.

The results of the first two studies prompted the investigation of transcription time. The results for the sample of Narrative Summaries transcribed in November (mean=1.27, std. dev.=1.51) indicate that 95% of normal distribution would fall between 0 (-1.68) and 4.22 days. Similarly, Narrative Summaries transcribed in January (mean=1.77, std. dev.=1.42) indicate that 95% of a normal distribution would fall between 0 (-1.01) and 4.55 days. The sample of Operative Reports (mean=1.21, std.dev.=1.28) represent a population which if normally distributed would include 95% of all cases in a range of 0 (-1.29) to 3.71 days. These ranges are quite conservative and account for cases nearly two standard deviations above the mean.

One must bear in mind that the completion of the transcription does not equate to being available for review. Documents completed after 1000 hours on weekdays are batched together, cataloged and pick up

the next day. Documents transcribed by off site contractors are typically transported to WRAMC the next working day. The pick up and subsequent filing is done by the chart room staffs. As a rule, these important documents are filed in the ITRs that same day. The longest delay in transferring these documents appears to be about two days. With an average 1-2 days for transcription and an additional full day for transferring the document, a fair estimate of dictation "turn around" time would be 3 days. Given the variability in these times, 5 days should include all but the rarest cases.

Given these statistics and my observations in the Transcription Service, the evidence indicates that the physicians estimate that these reports take an average of 8.53 days may be somewhat inflated. In either case, transcription does not appear to be the major limiting factor or bottleneck in this process as it accounts for only a small portion of the average 43 days in the chart room.

Analysis of the Idle ITRs Review

One threat to validity in the experimental design of this study was the method of selecting ITRs awaiting signature. The sample of ITRs awaiting attending physician review may not have been perfectly random since the ITRs present were most likely the ones that spent the longest time awaiting signature. The sample of records that had already been signed did not have this threat to validity and appeared to be a completely random sample. Recalling that these two waiting periods were 14 days and 7 days respectively, the review and signature step in the process appears to be one of the longest unnecessary delays in the entire process. This is estimate of some value, in that it provides an approximation of how long the ITRs are idle awaiting physician review. These estimates agree with the conjectures of the Chart Room Supervisors. Based on the information gathered, a very conservative estimate of the time required to obtain these two signatures would be 14 days. This is a significant period of time especially when one considers that the

majority of physicians surveyed, reported that the actual review and signature typically takes less than two minutes.

Recent Management Efforts and Improvements

Many measures have been taken during the course of this study and have improved the efficiency of the system. WRAMC has obtained the services of a highly qualified Medical Record Administrator and formed an ad hoc committee to improve performance. They identified "unity of command" as the top issue in improving the system. As a result, all of the chart rooms, coding and the transcription service were consolidated under a single directorate, the PAD.

Transcriptionists are prime examples of skilled employees that are difficult to recruit and retain. Recent efforts to obtain authorization to pay wages in excess of standard scales may be expanded to transcriptionists. An innovative incentive pay program has also been reestablished and should aid in increasing productivity. Leaders in the PAD aim to further improve the morale of the transcriptionists by

increasing the amount of personal contact they have with others in the directorate. During the study, the transcriptionists interviewed said that they felt as if they were outcasts, located 5 floors above most of the other PAD offices. This was particularly true when the section was transferred from control of the DMAA to the PAD. Interface with coworkers and leaders could improve the transcriptionists' working conditions by demonstrating the importance of the work they do and the value of the individuals to the organization. Increased job satisfaction may lead to lower levels of absenteeism, increased retention and increased productivity.

The management information system has been evaluated and some improvements initiated. Plans have been developed to network the three chart room databases and to begin using a more sophisticated database software package. A manually prepared supplement to the Medical Record Weekly Report is now being prepared. This reports the findings of a weekly manual inventory of physicians' boxes. It is provided

to Service Chiefs so they may better understand the summary data appearing in the Medical Record Weekly Report.

Discussion of Potential Improvements

Processing Procedure and Mechanism

Overall, the mechanism for processing ITRs appears to be a logical and workable one. Various services, departments and individual physicians have demonstrated that it is possible to meet the prescribed 30 day standard within the existing system. As with any system, we should set our sights on continual improvement. Toward that goal, I have identified some potential improvements to the system's procedures.

Transporting ITRs. The practice of relying on the ward staff to bring the ITRs of discharged patients to the chart rooms could be reevaluated. If the chart room staff were provided with a list of discharges and charged with collecting the ITRs at specified time, the task may proceed faster. The chart room staff has a vested interest in the ITRs of discharged patients, while the staff of the wards may be justly more

concerned with inpatients and their ITRs. If nothing else this method would provide a highly visible reminder for the MRTs to prepare the ITRs and may apply some pressure to expedite the task.

Frequent batches. At each step where the ITR or supporting documents travel from one location to another (ward to chart room, transcription to chart room) the documents are typically processed as a batch and transported once a day. Documents that miss the move by a few minutes will wait nearly 24 hours before being transported. By transporting two or more batches each day, such delays could be reduced.

On-line printing. Perhaps the best example of reducing our dependence on transporting paper, is the use of automation demonstrated at the NNMC at Bethesda. Transcribed documents completed by their contractors are electronically sent to the NNMC and printed there. They are available at the hospital as soon as each one is complete. This would reduce the time documents were idle as well as transportation costs that are paid directly or indirectly by the hospital.

Decentralized transcription. The departments and services that use alternate methods of transcription and processing ITRs internally, typically have fewer delinquent ITRs. The departments and services that have formed close working relationships with the Transcription Service have also attained superior results. This outcome points favorably to the decentralization of transcription. The advantages of this are that the system would be more responsive to the particular needs of individual services. Transcriptionists favor such arrangement because they must be familiar with the vocabulary of the specialties they support as well as the idiosyncracies of the dictating physicians. The disadvantages to this is that it would require more transcriptionists and would decrease the flexibility of the system in general.

Resident signatures. One of the steps in the process that may be eliminated entirely is the resident physicians' review and signature. AR 40-66 requires that attending physicians countersign Narrative Summaries of residents. If the Narrative Summaries

were dictated "for the attending, by the resident" the attending could simply sign in his own name and eliminate the need for a second signature. Although this has been reportedly done in other military hospitals, I found little support for the idea at WRAMC presently. The resident physicians' involvement with all aspects of practice is an important part of the graduate medical education process. This may also create situations where errors in transcription would go undetected.

Technological

The amount of time and effort expended in tracking the ITRs as they progress through all the required steps is significant. Each ITR is examined and evaluated 10 to 20 times. The result of some inspections is a simple initial on a cover sheet or stacking the ITR in a different location. Many of these evaluations mark a major change in status of the ITR and currently require an MRT to locate the computer record of that ITR and type modifications into a

specific database field. This is time consuming and prone to error.

Bar coding. Bar coding systems are currently available for medical records. Groups of ITRs which require a notation can simply be "scanned" in conjunction with a single key pad entry (i.e. Code "14" - ITR made available for attending physician review). An integrated system would allow the ITR processing system to interface with the PAD which would have already captured any required patient data such as name, date of birth, social security number, date of admission, etc. Such systems are found in conjunction with the record tracking software in use at the other hospitals visited. The addition of such technology would greatly improve WRAMC's ability to gather and analyze data to produce valuable management information.

Local Area Network. Local area Networks (LAN) would be helpful in integrating data sources. The data needed to produce informative management reports exists in many independent automated systems (three chart

rooms, digital dictation system, CHCS). The current system does give a lot of data about individual records but provides very little in the form of summary reports, descriptive or inferential statistics, trending or comparative analysis. If the data could be integrated in a common system, it could be analyzed using rapid automated routines to provide information about the performance of the entire system.

Composite Health Care System. CHCS has already helped to get laboratory and radiological information to physicians and coders. This is a benefit of non-location dependent access to ITR information and the ability to retrieve the same record from multiple distant locations simultaneously. Further integration of other information sources into this powerful information system will doubtlessly improve our access to information as well as decrease delays in collecting data and processing documents.

Voice recognition. A major technological advance in this field is the use of artificial intelligence and voice recognition. This could revolutionize the way

medical records are generated in the United States. The logic of using this tool becomes clearer after examining the systemic process of transcription. The general systems model contains inputs, processes and outputs. The principle inputs for the ITR are the thoughts of the physician. The fundamental process is to record these thoughts and thus document the care provided to the patient in a written standardized format. The primary output is the printed information in the ITR.

To better appreciate the value of what such a tool does it is important to conceptualize how the information is handled currently. Since it is not possible to quickly, directly and cost efficiently transform a persons thoughts into written documents, the process is somewhat more complicated than one might believe. The physician's thoughts must be expressed in a deliberate manner which can be recorded, language. The two most common methods of doing this are spoken language and written language. Spoken language is ordinarily faster to express, more easily understood

than many hand written documents and less tiring to generate. The first step in the transformation of the physician's thoughts to text is to pass the information to the system as voice. By use of electronics, the voice is transformed into binary digital data and stored. The recorded digital information is then retrieved and converted back to an audible voice recording. At this point the sounds of words are transcribed and stored as binary electronic text. The information is finally retrieved and through the use of computerized word processors converted to printed characters. This is the final required output of the system.

This process uses the input of voice and generates an output of printed text along with a secondary by product of electronic text. The electronic text may also serve as an important product of the process since it is a flexible backup to the printed text and can be used as an input into the process if the printed text is deficient. This electronic format can also serve as a primary source of information if it can be accessed

through an adequate information system. In time this may replace the need for printed text records to serve as official records.

Health care providers' abilities may best be utilized in performing the cognitive skills for which they have been trained. The time and effort required to prepare a report concerning a previous patient's treatment is taken at the expense of time that could be spent caring for additional patients. Although maintenance of a complete, timely and accurate medical record is a vital part of health care, the task is somewhat clerical in nature. By using alternate methods of completing these reports, we may be able to increase the amount of time clinicians have available to treat patients, improve the quality of care and reduce costs. A voice recognition transcription system would be open 24 hours a day, 7 days a week. It could actually be faster to dictate to this system than to a voice recorder, since the automated system makes use of context sensitive "trigger" phrases that cause large common blocks of text to be output. This enables

physicians to produce the text record of their cases and should reduce the number of errors in transcription, since the physician can proof read his dictation as the spoken words are recognized and instantly appear as text on a terminal in front of him. An added benefit of this system is that it follows a logical algorithm developed by experts. A non medical example of this feature is the following: The patient is a 1989 Buick automobile. It complains of being unable to start. The experts who designed the system know that there are many common reasons that cars do not start and that it would be imprudent for anyone to neglect these possible causes of the problem. Given the input of "failure to start" the system forces the user to confirm that he has considered each of these possibilities. The interface would automatically display messages such as the following:

> Checked ignition and found key action normal.
> Checked fuel system and found fuel level normal.
> Checked battery and found fluid and connections normal.

At this point the user could input his opinion on any other matters of the case. Such as a diagnosis that, based on age and history of this vehicle, the engine displays evidence of being seized up and is not repairable.

Imagine if the person responsible for repairing the Buick had come to this conclusion without checking the battery. The action would have resulted in the unnecessary loss of the vehicle. This did not occur because the automated program caused him to verify that he had indeed considered everything that a reasonable and prudent person in his position would be expected to consider under these circumstances.

With this layman's analogy in mind, it is easy to see the implications such a system has for preventing malpractice. One voice recognition system evaluated insures that these important items are recorded. It also serves as a simple non-threatening reminder to a physician who may have overlooked a consideration that is pertinent to the case. In this way, expert systems allow non-experts to do the work of experts. It is not

surprising that some insurance companies have drastically reduced malpractice insurance premiums for physicians who use this particular system. If the system's purpose is to transform information from voice to electronic text and printed text, leaders should examine tools that do precisely that. Currently available software and hardware packages are capable of performing this task and are in use in many hospitals today. Voice recognition technology eliminates many of these steps and allows a machine to do many of the tasks that are done in transcription service. The delay between dictation and the availability of the document for review and signature would be reduced to a matter of seconds. It would also reduce the delays and misroutings that are inherent in processes involving multiple handlers in multiple locations. A by-product of the immediate print out is an electronic text file of the dictation. This can be edited using common word processing software and can also be interfaced with CHCS. This capability makes the potential of using

paperless records a bit closer to becoming a reality.

Human Resource Management

Since one of the major themes in some of the delays described is noncompliance with established standards, one must consider personnel management and leadership. The lag in transferring ITRs from the wards to the chart rooms and the excessive delay in review and signature of ITRs are not the consequences of the existing mechanism. Rather, these delays are the result of human choices and behaviors. People and organizations do what they are rewarded to do. In large part this is based on the values that they have learned. Advocates of timely ITR processing would assert that there is true value in timely processing of ITRs. It promotes more accurate descriptions of the care rendered, provides continuity of care, serves to protect clinicians and the hospital legally, serves as a basis for third party reimbursement and adds to the body of knowledge available for research.

There may be other values that override or even conflict with timely ITR processing. Many of the

physicians involved with cases at WRAMC may not individually realize any of the previously mentioned benefits as a direct result of their efforts. The institution is rewarded financially through reimbursement in only a portion of all cases. The most important organizational benefit of timely ITR processing is accreditation by the JCAHO. Resident physicians specifically benefit from this accreditation. Training programs at non-accredited institutions are not well accepted, so maintaining this accreditation is in their best interest. But on a day-to-day basis there appears to be insufficient incentive for individual physicians, services and departments to rearrange their priorities and devote time or effort to the mission of timely ITR processing.

Such a change must be supported by top management. If the organization values timely ITR processing as it values proper patient care, medical education and caring for its soldiers, similarly effective reward structures should be developed for ITR processing. Meaningless rewards will produce commensurate results.

Standards that are not enforced and carry no penalty will not be adhered to. Where responsibility for these standards is not fixed, it may not be assumed and no one can be held accountable. Senior leaders must devote sufficient and appropriate resources to this task and obtain compliance if not cooperation.

As discussed earlier, the intermediate leader focuses on obtaining the cooperation of the residents to process ITRs in a timely manner. If intermediate leaders have no incentive for such priorities, it is unlikely they would aggressively promote this goal. Top leaders must develop measures to motivate the intermediate leaders. In addition to rewards such as favorable evaluations, official commendations and expressions of personal approval, these intermediate leaders have demonstrated a strong desire to control resources in order to enhance their department or service. This is understandable if not commendable and can serve as a leverage point for senior leaders attempting to bring about change. Resources may be

rewards. A system of allocating resources based on performance is outlined in Appendix 1.

Staffing the system is an important management function. The transcription service appears to be capable of producing the required output despite staffing shortages. The service under contract has been dependable but reluctant to expand their workload. This situation could be potentially problematic. In the past when WRAMC experienced difficulty with transcription services, it became solely dependent on the in-house staff. This in-house Transcription Service not only provides WRAMC with insurance against poor contract performance but is also a responsive service for documents that must be prepared quickly and the ability to transcribe other types of work related to the hospital's mission. The working conditions for the Transcription Service and chart room staff could be improved. Since WRAMC has outgrown its main building, space is at a premium. The density of the work space in these two areas reflect the need for additional space for the entire organization. Any long term plans

should reflect the need for enlarging the work space for these groups of workers to improve working conditions.

Information Management

One of the most striking discoveries of the visits to other hospitals was that these smaller facilities all had automated record tracking systems and used them to varying degrees. As illustrated throughout the study, there is a plethora of data that can be collected from a myriad of sources, but the amount of focused management information available is very limited. One might immediately conclude that increased automation is the key to this aspect of the problem. However, a foundation for any successful system automation is a clear understanding of the information system and the needs of the organization. After determining management's information requirements, leaders should obtain the software that best meets these needs and subsequently the hardware to support the software selected. Since WRAMC has made significant investments in existing hardware,

compatibility will be an issue. Some software products evaluated operate only in a UNIX environment which is incompatible with many mainframe computers in hospitals.

Some of the important elements of management information required include: (a) performance related to processing time for different steps in the process (dictation, transcription, reviews, physical transfers etc.), (b) summary statistics for groups of records, current performance profiles of departments, services and individual physicians, along with (c) trends of these same groups and individuals. Since the process involves so many subprocesses with a large potential for error, we must monitor the common mishaps that cause the process to deviate from the plan. Some of these errors include (a) lost dictation recordings, (b) incomprehensible voice recordings, (c) ITRs placed in the wrong physician's box, (d) ITRs forwarded to physicians while lacking required documentation, (e) errors in transcription, (f) lost printed reports and (g) cases involving cancelled admissions.

The system must also provide first level data to the system users who are responsible for all data entry. If the system does not meet their needs, they will develop alternate methods and not use the automated system. If this occurs, the data entered will be incomplete and any resulting information and subsequent analysis will be flawed. In obtaining software, leaders must decide to either use existing commercial products or to develop unique software for the specific application. Since WRAMC's requirements are not terribly different from other large hospitals, leaders would do well to first examine existing products. Although this may not include every single feature desired, it may be quite satisfactory and can be modified if need be. However, these modifications can be expensive and if the package is modified extensively it may not be compatible with future software upgrades. On the other hand, producing the software could be very expensive and also leaves the users with limited options for upgrades. In my preliminary evaluation of two popular software packages

currently available, I found that both would meet WRAMC's needs as outlined.

Chapter IV - Summary and Recommendations

Summary

The medical record processing system at WRAMC is a complex system that has shown continuous improvement over the past year. The system's performance is dependent on the cooperation of many otherwise unrelated departments and shows tremendous variability between departments. The system's overall performance has also varied over the course of time. Consistent high performance by some departments and periods of satisfactory performance by the organization as a whole demonstrate that the existing system can be used to meet the organization's needs. The fact that this performance is not universal or consistent suggests that the cost of high performance in processing ITRs is too high or that the value of the rewards is too low. The information gathered in this study suggests that the problem of delinquent medical records could be diminished through improvements in the organization's procedures and technology and by obtaining greater compliance with organizational policies.

Medical records are an often neglected but vital part of caring for patients. They promote more accurate descriptions of the medical care, provide for continuity of care, and serve to protect providers and the hospital legally. They serve as a basis for third party reimbursement and add to the body of knowledge available for research. Beyond the intrinsic value of complete and timely ITRs, medical records serve as a major evaluation area for the JCAHO. The quality of medical care rendered to patients is judged by what is documented in the medical record. Comp_ ng with the JCAHO standards and maintaining JCAHO accreditation is vital to WRAMC.

A key resource is physicians' time. If the system does not become more efficient through the use of technology or training, physicians will simply have to reprioritize their time to process ITRs quickly or spend more time on this task. This time may be taken at the expense of other activities including direct patient care, training, and personal time. Requiring physicians to complete their records tasks promptly

should not increase their workload. Since the physicians must take the time to complete all of their ITRs sooner or later, the amount of work performed should be the same. However, strict suspenses would make their already stringent schedules even less flexible. Periodic training in the related areas of individual time management, proper dictation procedures and review of ITRs may be very helpful for physicians and improve WRAMC's ITR processing performance.

Leaders may take one of two courses of action. The first option is to quietly implement the inexpensive and non-disruptive changes described earlier, to raise performance to a level well within the JCAHO standards. The second course of action is to fully support drastic reform, change the organization's values related to medical records and strive for continuous quality improvement. Limited support for improvement would signal that the matter is of only minor or temporary importance. This second alternative would require a long term commitment, substantial

financial expenditures and would involve very strong and widespread resistance to change.

Deciding to what extent the system must be improved is not a simple choice that has an obvious answer. While highest quality may appear to be the clear choice, one must consider the costs involved with that choice. The financial expenses for equipment, services and personnel could be calculated very objectively. However, there are other costs associated with such a change. If performance is not improved through efficiency, it must be increased by devoting more resources to the task. Top leaders must decide to what extent they are willing to bear the different direct and indirect costs (funds, medical education, staff job satisfaction, patient care workload, patient access etc.) of improving the medical records processing system.

Recommendations

Recommendation 1

WRAMC must develop a more sophisticated information system for monitoring the performance of

the medical record processing system. Leaders must have analyzed information and not simply summarized data. This information should be focused and specific to enable managers to initially identify systemic performance problems and to later monitor the associated processes. The information system should also provide rapid access to (a) information on performance related to processing time for different steps in the process, (b) summary statistics for groups of records, (c) performance profiles of selected departments, services and individual physicians and, (d) trend analysis for these report modules.

This feedback system should also monitor and evaluate the occurrence events which may signal systemic problems. These occurrence screens should include (a) lost dictation recordings, (b) incomprehensible voice recordings, (c) ITRs placed in the wrong physician's box, (d) ITRs forwarded to physicians while lacking required documentation, (e) errors in transcription, and (f) others indicators useful to system managers. The complexity of this

project and the nature of a one time installation may require the services of automation and information systems consultants.

Recommendation 2

Using the most comprehensive information available, top leaders, as well as department and service chiefs, should institute appropriate reward systems which are contingent upon performance and offer adequate incentives for complying with established standards. The information produced by the management information system should not simply be a historical record. This information should serves as a basis for decision making. Leaders should allocate funds, staff, facilities, equipment and management effort to improving poor performance and rewarding high performance. Leadership has been demonstrated to be a key factor in timely ITR processing within WRAMC. Top leaders must fix responsibility for performance with those subordinate leaders who have the authority to demand compliance with the standards.

Recommendation 3

WRAMC must make better use of cost effective technological advances. Technology offers us the ability to do more work with the same amount of human effort or the same amount of work with less human effort. Voice recognition and transcription technology is one of the most dramatic illustrations of this idea. Individual clinical service chiefs should explore this technology, develop criteria for its future use and initiate efforts to purchase this technology. The Directorate of Information Management should assist in evaluating this computer technology and encourage its proliferation.

New software packages would allow the chart rooms to be networked, use bar code scanning devices and produce the information described earlier. Bar coding would reduce the amount of time ITRs remain idle so the system may track their progress. It would also enable the system to collect more information and reduce the number of errors in data input. Simply networking the existing data bases will provide only a small benefit,

since the existing databases would still primarily be maintained for internal use in managing task level data.

Recommendation 4

While current procedures are adequate, PAD should strive to implement more efficient procedures. The following measures are examples of procedural changes that should each produce a minor improvement in processing time. Installing an on site printer with telecommunications capability would eliminate the one to two day delay associated with physically transporting the printed transcriptions from off site contractors. This would impact approximately half of all transcriptions. Another minor improvement would be to shift responsibility for transporting the ITR from the wards to the chart rooms. The chart rooms should assume this responsibility since the task is so important to them and they can serve to expedite this process. Small improvements in processing time may also result from increasing the frequency of transporting batches of ITRs within the hospital.

Since the organization and operation of the medical record processing system fall under PAD, this study is forwarded to the Director of the Patient Administration Directorate for his consideration. Implementing procedural and technological improvements in concert with human resources management measures should dramatically improve the medical records processing system at WRAMC. These improvements should, in turn, lead to a lower Inpatient Treatment Record delinquency rate.

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Appendix A

A Performance Based Method of Allocating Resources to Encourage Timely ITR Processing

This tool focuses on the physicians. They cannot be held solely responsible for ITR processing. But leaders must recognize that much of the success or failure of the ITR processing system hinges on the behavior of these clinicians. This reward system focuses on one major group of people involved with a segment of the system. Other systems should be devised for other groups involved. Increasing incentives for one group while ignoring another group would alienate the neglected group and generate dissatisfaction. Transcription service is another such element in the system. A pay incentive program for transcriptionists is one such program that is being reestablished for in house civilian transcriptionists.

People do what they are rewarded to do. Without a formal system of incentives and disincentives, we still see reward seeking behavior. Even though clinical services do not receive any tangible direct reward for

ITR processing, they can be rewarded with additional discretionary time by not quickly processing them.

Clinical services have a great number of responsibilities, not the least of which is caring for patients. This is a highly visible task and is constantly monitored. Clinicians are judged by how well they care for patients. Quality is in part a function of how much time clinicians spend with patients. It may also be influenced by the amount of time physicians have to working other aspects of the case and away from patients (i.e. reviewing test results, consulting with others and reading applicable writings). At the service or department level, groups of clinicians are judged by how much care they provide. Productivity measurements allow leaders to do this. Any behavior that interferes with clinicians' ability to do what they are rewarded for should naturally be avoided. Deferring ITR processing results in no punishment, negative reinforcement or disincentive. Rather, physicians are rewarded with time to attend to patient care and other activities with subsequent meaningful

rewards. This position is strongly supported by the results of the Physician Opinion Survey which cites the top three reasons for delaying dictating and signing ITRs as: "Not enough time, Takes away from direct patient care and provides no personal or professional rewards."

To establish a reward structure which would promote improved productivity in ITR processing, leaders must evaluate what rewards are available and would be effective in motivating this group. We must learn what they value and evaluate our ability to provide it. We must also evaluate the impact of withholding these rewards. Not providing resources that clinicians truly need to perform their duties (i.e. electricity, common medical supplies etc.) would be disastrous to patient care. Leaders must determine if the resource is a reward or a necessity. A certain amount of some resources may be considered a necessity and any additional level of resourcing might actually be a luxury. Consider the following as possible rewards: (a) selected resources, (b) recognition,

(c) opportunities for personal professional growth, and (d) appealing to their higher order needs.

For such a program to be effective it should provide timely feedback. If performance were evaluated on a quarterly basis, leaders could make corrections or commendations with their departments to promote positive performance, rather than waiting a year to find out that they were doing poorly. One difficulty is that this places the departments in a difficult position for planning purposes. If they don't know how much money they will receive for a particular period until shortly before the period, they may not be able to plan to use it as effectively as if they had more notice. One solution to this dilemma is to give feed back quickly about how each department performed and how much they will get two or three quarters out.

Consider the following mechanism for distributing a sum of money. Throughout the example the term "department" is used. The same methods would be equally useful to allocate resources to services within a department. The original source of the initial sum

used in this example may represent the customary annual budget increase (Table 22). The method primarily considers the performance rate (Table 23) of each department in processing ITRs in less than 30 days (percentage on time) and the size of the physician staff assigned to the department. The size of the physician staff is defined as that percentage of the physicians assigned to the hospital and subject to this method of resource allocation (Table 24). These two factors are weighted equally and multiplied by the dollar amount available to be distributed (Table 25). Departments which are not directly involved with processing medical records would be exempt from the system and receive their resources based on other traditional methods.

If all departments were fully successful in completing ITRs on time there would be no residual. This residual represents the funds that could have been allocated to the departments if they had no shortcomings. Its size is proportional to the overall performance of the hospital. The residual could be

Table 22. Normal and Proposed Fund Distribution

Total available for "TDY/furnishings": $300,000

	Normal Funding Distribution	Proposed Fund Distribution	
Pharmacy	25,000	25,000	
Lab	20,000	20,000	
Radiology	30,000	30,000	
Medicine	50,000	*)	
Surgery	55,000	*)	130,000
Peds	15,000	*)	total
OB/Gyn	15,000	*)	
TOTAL	300,000	300,000	

Table 23. Department Performance

	Records Processed	Processed < 30 days	% ITRs Successful
Medicine	1200	1020	.85
Surgery	1000	420	.42
Peds	200	130	.65
OB/Gyn	180	171	.95
TOTAL	2380	1741	.73

Table 24. Department Size

	# of physicians	% of physicians
Medicine	100	40
Surgery	87	35
Peds	42	15
OB/Gyn	30	10
TOTAL	250	100

Table 25. Performance/Size based allocation

Dept.	Total $ Available		% of MDs		ITR Success		Funds Allocated
Medicine	$130K	x	.40	x	.85	=	44,200
Surgery	130K	x	.35	x	.42	=	19,110
Peds	130K	x	.15	x	.65	=	12,675
OB/Gyn	130K	x	.10	x	.95	=	12,350
TOTAL			100				$88,335

$130,000 available

<u>- 88,335 allocated</u>

$ 41,665 residual

retained by the commander for other accounts or further allocated. Further allocation could be done with repeated cycles of the previous procedure or using a method that emphasizes total number of "successful" ITRs. During the time period, 1741 records were processed in required 30 days or less. The departments responsible for this success would share the reward for these results based simply on how many of those ITRs each department processed. The residual $41,665 would be distributed to recognize the 1,741 successes. In effect each "timely" ITR would be worth $23.93 to the department responsible. Such a secondary allocation of the residual would be made as shown in Table 26.

Use of this second method fully allocates the residual (Table 27) and rewards departments which have a relatively higher volume of records. Since these same high ITR volume departments have a greater influence on the hospital's overall delinquency rate, this would seem to be a desirable feature of the model. One might consider using this as a primary allocation method, but since it does not consider the size of the

Table 26. Distribution of Residual Funds

	Individual ITR "Bonus"	Processed < 30 days		Dept. "Bonus"
Medicine	$23.93 x	1020	=	$24,410
Surgery	23.93 x	420	=	10,050
Peds	23.93 x	130	=	3,110
OB/Gyn	23.93 x	171	=	4,095
TOTAL		1741		$41,665

Table 27. Total Funds Allocated

	1st Round		2d Round		Dept. Total
Medicine	$44,200	+	24,410	=	68,610
Surgery	19,110	+	10,050	=	29,160
Peds	12,675	+	3,110	=	15,785
OB/Gyn	12,350	+	4,095	=	16,445
TOTAL	88,335	+	41,665	=	$130,000

department or its comparative success rate, it may produce unsatisfactory results skewed in favor of departments with more acute patients with simple and easily documented cases.

It is assumed that budgets will continue to increase each year. For the first few years of this system, the funds allocated by the incentive method could be simply the increase in the total budget for a particular program. In this way, no department wouldhave to take a cut in funding. No success in records processing would result in no increase in funding. A worse case scenario would be that a completely delinquent department would receive the same budget that it received the previous year. A drawback to this level of commitment in implementation is that mediocre performance in records processing would still produce a moderate increase in that department's budget. With so little at risk, some departments which experience difficulty processing records will find little incentive to improve. The "cost" of drastically changing their routines may not be worth gaining a

slightly larger budget. After a relatively short adjustment and education period, leaders should "raise the stakes" and make high performance rewarded by substantial rewards. Leaders could make a larger and larger portion of the resources contingent on performance and at the same time demanding a higher standard of performance.

Case load, case mix and the relative complexity if ITR processing varies among departments. This variation is not addressed in this allocation method. This omission is intentional since this variation is also not addressed by the JCAHO in their performance standards. This places even greater responsibility with the clinical departments services to adjust their staffing as needed and work with the PAD and do what ever it is necessary takes to make the system work and meet the standard.

Annex B - Physician opinion Survey Instrument.

The actual survey instrument used 17 pitch type and rather narrow margins. In this way it was possible to include all of the following questions on both side of a single sheet of paper. The text of the survey read as follows:

Medical Records Processing System Survey

Please take 3-5 minutes to complete the survey to be used as part of a management thesis. Please "check" the blanks you choose and "circle" your other choices. Written comments are welcome. You will receive a summary of the results. Thank you. CPT Mike Rowbotham 6-3955.

1. How many times each week do you typically go to the chart room?

<1 1 2 3 4 5 6 7 >7

2. In most cases, how many days after discharge do you dictate a narrative summary?

0-2 3-4 5-6 7-8 9-10 11-12 13-14 >14

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1. How many times each week do you typically go to the chart room?

<1 1 2 3 4 5 6 7 >7

2. In most cases, how many days after discharge do you dictate a narrative summary?

0-2 3-4 5-6 7-8 9-10 11-12 13-14 >14

3. How many narrative summaries do you typically dictate on each trip to the chart room?

0 1 2 3 4 5 6 7 8 9 10 or more

4. Do your leaders encourage you to dictate narrative summaries within a certain time? Y / N

5. If so, what goal do they set for you? (In days post discharge, presumably)

0-2 3-4 5-6 7-8 9-10 11-12 13-14 15-16

6. Is this based on: (check any applicable)

___Formal DA Regs ___Written WRAMC policy

___Attendings' guidance ___Other

___Accepted department standards

___Service Chiefs' policy

7. How would you rate your ability to meet such a goal? (What % of cases?)

0%-10% 11%-20% 21%-30% 31%-40% 41%-50%

51%-60% 61%-70% 71%-80% 81%-90% 91%-100%

8. In those cases where you cannot meet this goal, how many days does it take to dictate?

1-2 3-4 5-6 7-8 9-10 11-12 13-14 15-16

17-18 19-20 21-22 23-24 25-26

9. What were the reasons/contributing factors involved with your longest delay in dictating a summary?

___Lost chart

___Dictation lost. Needed to redictate.

___No time available

___Chart room too full.

___Delay in supporting reports

___Other:

10. In your estimation, how knowledgeable are your leaders regarding your efforts in dictating/signing??

___Almost always have up to date knowledge of my work.

___Regularly have some idea of my recent efforts.

___Occasionally have some estimate of my work in dictating.

___Seldom has knowledge of my efforts or performance in this area.

11. In your estimation, is your timely dictating and signing important your leaders?

Not at all Very little To some extent

Very much Most of all

12. I am complimented or otherwise gratified by my leaders based on my performance in dictating and signing.

Never Seldom Occasionally Regularly Often

13. I am criticized or otherwise penalized by my leaders based on my performance in dictating and signing.

Never Seldom Occasionally Regularly Often

14. To what extent do you feel your performance in this area will influence your performance evaluations?

Not at all Very little To some extent

Very much Most of all

15. In your department, what actions/measures do leaders <u>actually</u> take to promote timely records processing?

___General announcements ___"One-on-one"

___Awards Compliments

___Counselling ___EMail

___Preferential scheduling ___ Phone calls

___Letters of commendation ___Extra duty

___Reprimands ___Extra "trips"

___Loss of "trips"

___Recognition in meetings

___Comments on evaluations

___Provide lists of work awaiting action

___Admin tracks/quantifies performance ___Other:

16. Ref #15. Of those you <u>checked</u>, please circle "checks" of those you feel are effective.

17. Ref #15. What measures <u>not checked</u>, do you feel would be effective? (Please place an "O" on the line.)

18. <u>In general,</u> what rewards available to your leaders, should be used more frequently for you and your peers?

___Informal compliments and acknowledgement of your efforts.

___Time off.

___Favorable comments on regular evaluations.

___Letters of commendation.

___Department of the Army awards.

___Favorable duty assignments/schedules.

___Professional education opportunities (local/TDY training)

19. What is the single the most significant barrier to dictating narrative summaries?

___Preparation required by physicians

___Lack of incentives

___Waiting for wards/chart rooms to consolidate papers

___Conflicting requirements/higher priorities

___Time required to dictate

___Other_____

20. How long after dictating, are your narrative summaries ready for your review?

0-2 3-4 5-6 7-8 9-10 11-12 13-14 >14 days

21. How long after dictating other reports, are they ready for review?

0-2 3-4 5-6 7-8 9-10 11-12 13-14 >14 days

22. About how many of all your dictations get "lost" and must be redictated?

0%-10% 11%-20% 21%-30% 31%-40% 41%-50%

51%-60% 61%-70% 71%-80% 81%-90% 91%-100%

23. About how many of your charts get sent back to transcription for correction?

0%-10% 11%-20% 21%-30% 31%-40% 41%-50%

51%-60% 61%-70% 71%-80% 81%-90% 91%-100%

24. About how many of your charts in your box get sent back to the analysts for missing supporting documents?

0%-10% 11%-20% 21%-30% 31%-40% 41%-50%

51%-60% 61%-70% 71%-80% 81%-90% 91%-100%

25. (Ref. 24) Most common missing documents: (Single Check for "More than occasionally", Double Check for "Significant problem" & Triple Check for "Very frequent systemic failure"

___Path report ___Cath report ___Radiology report

___Op report ___Other:_____

26. About how many of the charts put in your "box" should have gone to another physician's "box"?

0%-10% 11%-20% 21%-30% 31%-40% 41%-50%

51%-60% 61%-70% 71%-80% 81%-90% 91%-100%

Ref. 27 & 28, Check all that apply to you.

27. I strive to be prompt in dictating and signing reports/summaries because:

___It is required by the JCAHO.

___It is required by Army regulations.

___It is the Commanding General policy.

___It is required by my immediate supervisor.

___It provides a formal record the course of treatment.

___It serves as the basis for third party reimbursement.

___It helps me insure that I have completed the intended course of treatment.

___It serves as legal document to defend me and the hospital if necessary.

___It adds to the body of knowledge available to researchers.

___It enables QA to conduct more timely occurrence screening.

___The cases are fresh in my mind and I recall the details better.

___Other people involved with processing the records must wait for my work.

___It helps provide continuity of care for future treatment.

___Delinquent records would reflect badly on this system, my department and WRAMC.

28. I delay dictating and signing reports/summaries because:

___I do not have enough time.

___It takes time away from direct patient care.

___I have difficulty in putting my thoughts into the proper report format.

___I dislike the chart room environment.

___It takes a considerable amount of time to go to the chart room.

___I have so much dictating and signing to do, it seems like an overwhelming task.

___I never know if there is work for me to do.

___It usually involves older cases which are not fresh in my mind.

___It provides no personal or professional rewards.

___I do not feel it is my responsibility.

___I have other duties, beyond patient care, which are more important.

___The information is already recorded in the form of notes. It won't be lost.

___I prefer to think about the cases for some time first.

___It provides no benefit to the patient.

___The system is ineffective and my efforts to expedite processing would not make any difference.

29. When given records for signature, I generally:

___Just sign it.

___Make sure it is the case I had in mind and that it is about the right length.

___Check any unusual aspects of the case that might have problems.

___Review the entire report for errors.

___Compare the report to notes and consider improving the report.

30. **This review and signature usually takes about:**

< 1 min 1-2 mins 2-5 mins 5-10 mins

10-15 mins 15-20 mins > 20 mins

Comments:

MEDICAL RECORDS WEEKLY REPORT

SERVICE	PATIENT DISPOSITION				# RECORDS TO BE PROCESSED				# OF DELINQUENT UNCODED RECORDS				CODED DELINQUENT RECORDS				# OF RECORDS TURNED INTO CRM			
DATE	DEC 90	JAN 91	FEB 91	MAR 91	1 APR	8 APR	15 APR	22 APR	1 APR	8 APR	15 APR	22 APR	1 APR	8 APR	15 APR	22 APR	29 MAR	5 APR	12 APR	19 APR
INT MED-AAAA	242	250	232	290	340	321	324	354	104	113	128	156	80	143	91	62	50	61	78	106
INF DIS-AARA	58	37	55	71	50	48	64	66	26	27	30	22	9	15	2	5	2	20	41	12
ALLERGY-AASA	18	23	17	18	17	19	21	23	3	3	6	9	3	1	0	3	1	0	2	2
CARDIO-AABA	89	107	96	117	143	138	139	150	59	52	44	45	25	61	38	38	26	36	59	10
CCU-AACA	13	19	19	16	15	12	12	13	5	4	5	7	1	5	6	7	1	1	3	1
DERM-AADA	17	28	19	29	14	23	16	20	4	4	4	6	5	2	1	1	1	0	14	2
ENDO-AAEA	28	30	39	39	38	46	46	47	17	21	21	13	20	19	5	19	21	4	16	6
GASTRO-AAFA	159	228	207	254	168	163	156	111	12	6	15	11	9	27	3	14	25	24	98	54
HEMAT-AAGA	46	41	37	40	27	27	37	33	4	5	11	13	26	34	9	12	3	3	30	0
MICU-AAHA	16	22	22	15	25	25	21	21	12	10	8	8	9	16	8	4	0	3	2	2
NEPHRO-AAIA	11	9	10	19	7	4	8	8	0	0	0	0	3	3	5	4	2	1	6	11
NEURO-AAJA	50	50	59	82	35	31	31	29	6	3	2	1	0	7	11	4	9	9	36	22
ONCOL-AAKA	17	27	31	28	20	22	23	25	9	8	11	12	19	21	13	2	0	6	35	5
PULMON-AALA	5	5	3	4	4	3	4	3	1	1	2	1	2	5	4	4	0	0	1	0
RHEUM-AAMA	2	4	4	1	4	2	3	3	3	1	2	2	0	1	1	1	1	0	2	0
PM&R-AANA				2	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0
GEN SUR-ABAA	120	117	111	145	111	98	109	112	24	18	15	18	15	2	1	2	33	46	98	18
THORAC-ABBA	26	29	34	44	42	35	38	32	10	11	13	12	0	0	0	0	6	11	23	10
P.VASC-ABNA	30	40	26	42	47	43	50	57	12	11	10	14	2	14	5	3	8	5	1	4

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SERVICE	PATIENT DISPOSITION				* RECORDS TO BE PROCESSED				* OF DELINQUENT UNCODED RECORDS				CODED DELINQUENT RECORDS				* OF RECORDS TURNED INTO CRM			
DATE	DEC 90	JAN 91	FEB 91	MAR 91	1 APR	8 APR	15 APR	22 APR	1 APR	8 APR	15 APR	22 APR	1 APR	8 APR	15 APR	22 APR	29 MAR	5 APR	12 APR	19 APR
SICU-ABCA	0	2	1	2	3	3	3	3	1	1	2	1	3	2	3	4	0	0	2	0
NUR.SUR-ABDA	85	71	57	97	82	97	69	68	18	24	21	12	37	11	44	90	26	7	4	0
OPHTH-ABEA	69	69	91	71	85	91	84	105	29	32	36	43	7	7	16	5	5	20	15	13
ORL SUR-ABFA	17	17	19	24	26	28	35	31	15	14	16	16	12	9	14	5	0	13	1	0
OTOLAR-ABGA	105	111	90	112	89	98	84	94	13	20	25	34	17	11	9	14	17	32	18	22
FED SUR-ABHA	5	4	3	11	5	7	4	4	0	0	1	1	0	1	0	0	0	0	0	0
PLASTIC-ABIA	28	42	46	35	47	41	51	45	22	18	21	20	18	14	5	4	26	16	5	13
UROL-ABKA	91	101	108	136	80	70	58	75	0	0	0	0	0	0	0	0	10	13	48	16
ORG TRN-ABLA	23	23	25	23	12	16	14	19	4	5	4	5	6	2	0	0	7	11	7	10
GYN-ACAA	99	88	89	91	93	91	99	99	38	28	27	30	29	21	15	25	29	11	43	20
OB-ACBA	118	130	102	124	71	66	64	79	23	26	24	24	12	0	2	3	29	0	48	67
PEDS-ADAA	121	107	116	133	71	71	82	74	9	8	9	9	22	14	15	32	20	40	17	18
NUR-ADBA	75	93	78	76	36	31	34	44	18	14	10	8	5	19	9	16	62	0	20	44
NICU-ADCA	4	8	7	13	16	15	14	10	8	10	9	7	0	0	0	0	0	0	0	0
ORTHO-AEAA	98	114	86	106	104	104	123	124	26	30	34	33	31	38	25	49	12	17	31	1
HND-SUR-AECA	19	15	30	25	30	27	37	41	13	10	13	14	4	1	0	2	21	10	22	1
POD-AEBA	5	6	7	7	5	4	5	4	0	0	1	1	1	0	0	4	1	0	0	0
PSYCH-AFAA	74	79	83	103	89	83	76	80	19	20	9	16	3	20	16	42	22	32	12	12
TOTAL	1983	2146	2062	2445	2051	2003	2039	2108	567	558	589	624	435	546	376	483	476	452	798	506

TOTAL DELINQUENT CHARTS

1 APR - 1002
8 APR - 1104
15 APR - 965
22 APR - 1107